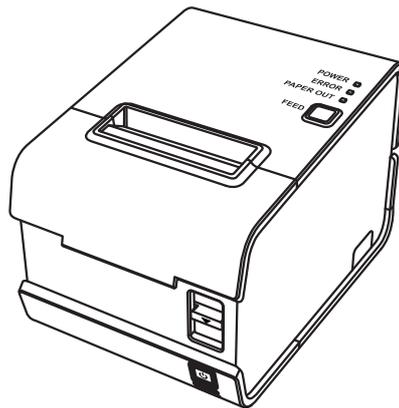


TP-3020

RECEIPT PRINTER



OPERATOR'S Manual

All specifications are subject to change without notice

Warning - U.S.

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Notice - Canada

This Apparatus complies with class "A" limits for radio interference as specified in the Canadian department of communications radio interference regulations.

Get appareil est conforme aux normes class "A" d'interference radio tel que specifier par ministre canadien des communications dans les reglements d'interference radio.

Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Caution

Some semiconductor devices are easily damaged by static electricity. You should turn the printer "OFF", before you connect or remove the cables on the rear side, in order to guard the printer against the static electricity. If the printer is damaged by the static electricity, you should turn the printer "OFF".

INTRODUCTION

The TP-3020 Roll Printer is designed for use with electronic instruments such as system ECR, POS, banking equipment, computer peripheral equipment, etc.

The main features of the printer are as follows:

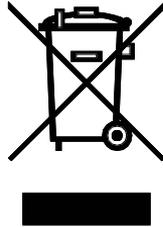
1. High speed printing : 52 lines per second.
2. Low noise thermal printing.
3. RS-232 serial/IEEE1284 parallel/USB/Ethernet/Bluetooth/Wireless LAN interface.
4. The data buffer allows the unit to receive print data even during printing.
5. Peripheral units drive circuit enables control of external devices such as cash drawer.
6. Characters can be scaled up to 64 times compared to it's original size.
7. Bar code printing is possible by using a bar code command.
8. Different print densities can be selected by DIP switches.
9. 2-dimensional bar code(PDF-417) and Two color printing.

Please be sure to read the instruction in this manual carefully before using your TP-3020.

| |
|--|
| <p>NOTES : The socket-outlet shall be near the equipment and it shall be easily accessible.</p> |
|--|

LEGISLATION AND WEEE SYMBOL

2002/96/CE Waste Electrical and Electronic Equipment Directive on the treatment, collection, recycling and disposal of electric and electronic devices and their components.



The crossed dustbin symbol on the device means that it should not be disposed of with other household wastes at the end of its working life. Instead, the device should be taken to the waste collection centres for activation of the treatment, collection, recycling and disposal procedure.

To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this from other types of wastes and recycle it responsibly to promote the sustainable reuse of material resources.

Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take item for environmentally safe recycling.

Business users should contact their supplier and check the terms and conditions of the purchase contract.

This product should not be mixed with other commercial wastes for disposal.

RoHS (Restriction of Hazardous Substances)



External adapter information

External Power supply

Voltage: 24 V d.c.

Max. short circuit current: 3.93 A

Max. power: 78.13 VA

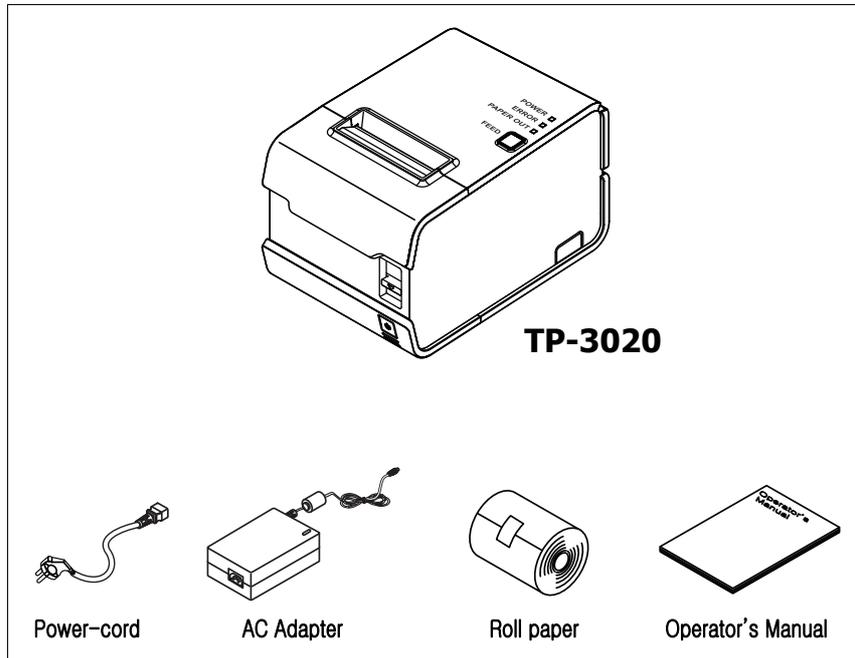
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Chapter 1. Setting Up the Printer

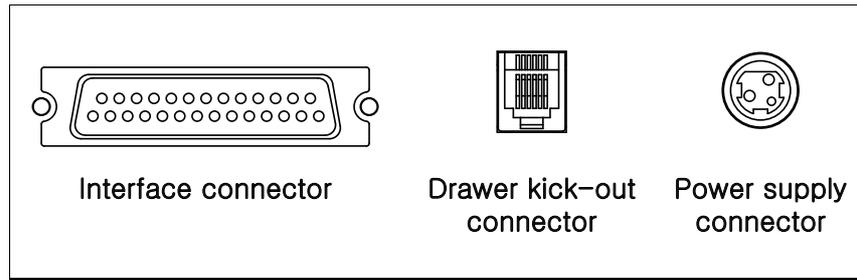
1-1. Unpacking

Your printer box should include these items. If any items are damaged or missing, please contact your dealer for assistance.



1-2. Connecting the Cables

You can connect up to three cables to the printer. They are all connected to the connector panel on the back of the printer, which is shown as below:

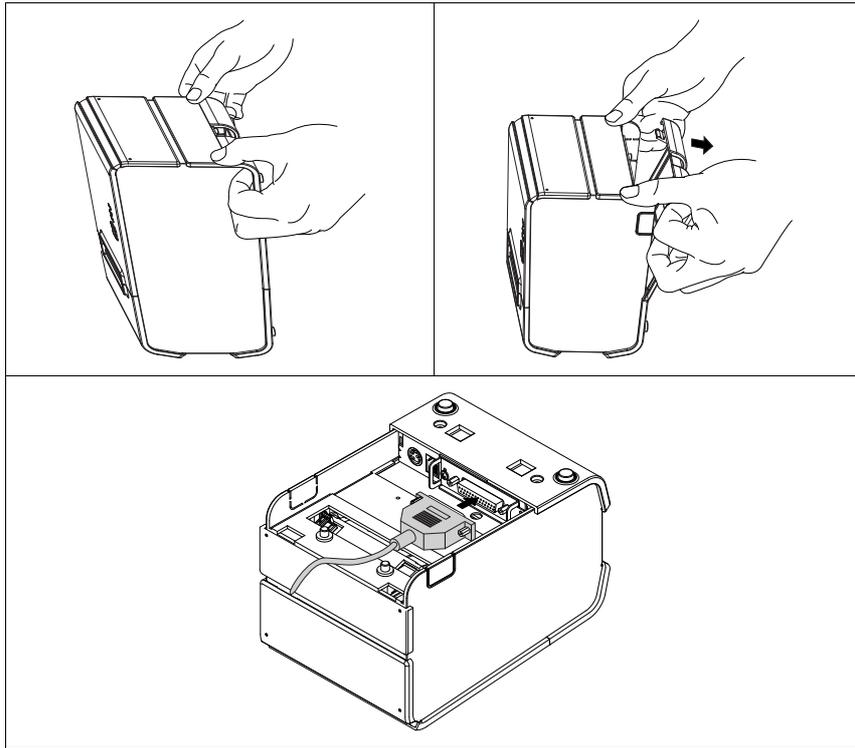


NOTES : Before connecting any of the cables, make sure that both the printer and the computer should be turned off.

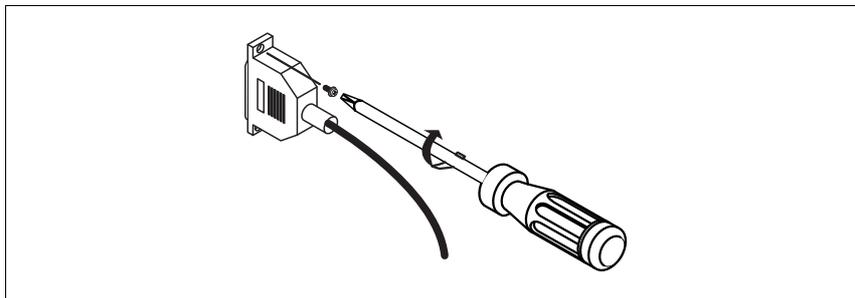
1-3. Connecting the computer

You need an appropriate interface cable.

1. Plug the cable connector securely into the printer's interface connector.
2. Tighten the screws on both sides of the cable connector.



3. Attach the other end of the cable to the computer.



1-4. Connecting the Drawer

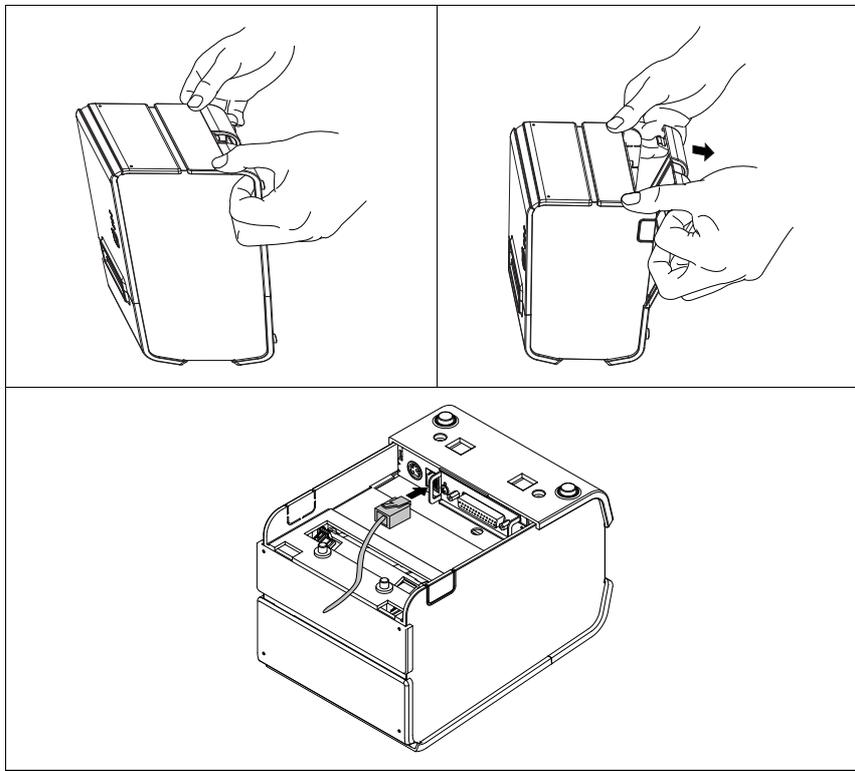
WARNING:

Use a drawer that matches the printer specification. Using an improper drawer may damage the drawer as well as the printer.

CAUTION:

Do not connect a telephone line to the drawer kick-out connector; otherwise the printer and the telephone line may be damaged.

Plug the drawer cable into the drawer kick-out connector on the back of the printer next to the power supply connector.



1-5. Connecting the Power Supply

Use the optional Power supply for your printer.

WARNING:

Make sure that you use the attached Power supply or equivalent. Using an incorrect power supply may cause fire or electrical shock.

CAUTIONS:

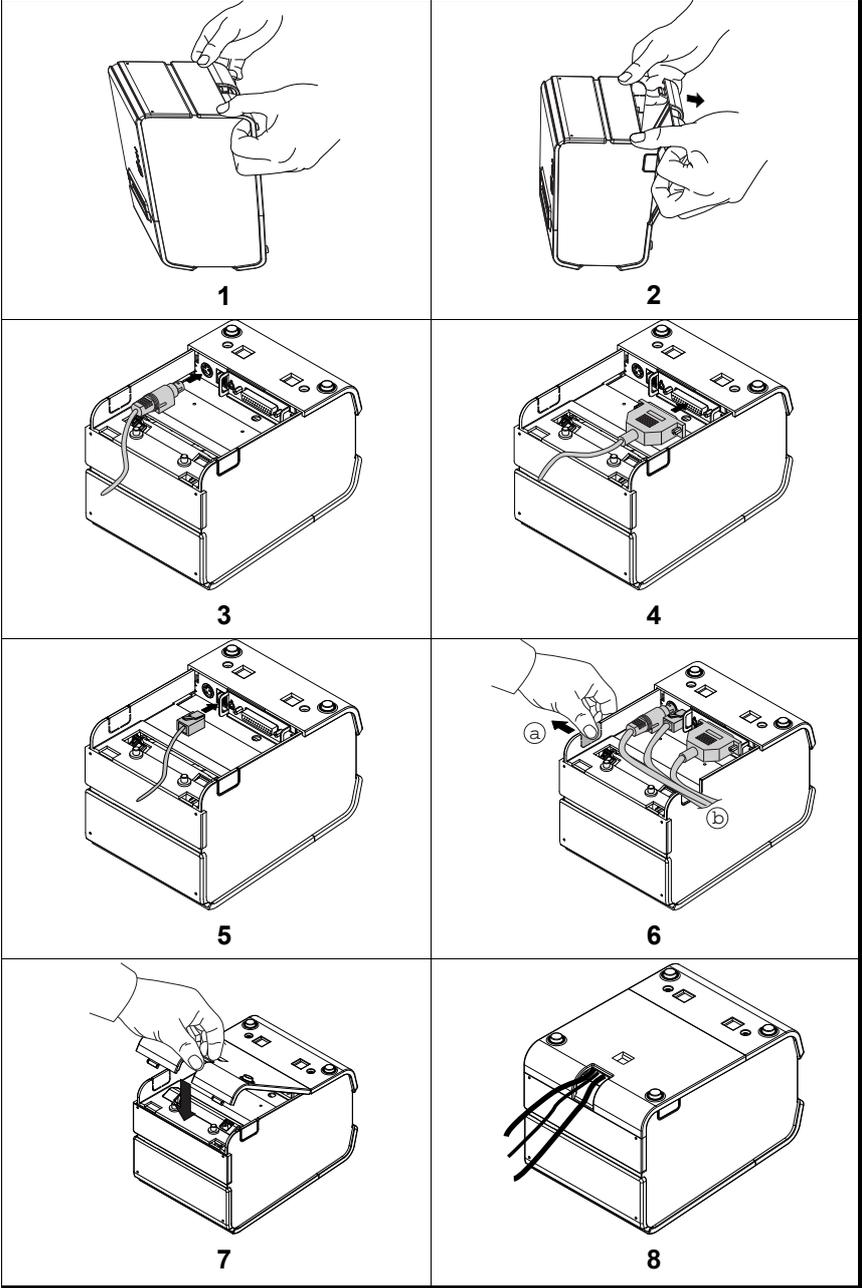
When connecting or disconnecting the power supply from the printer, make sure that the power supply is not plugged into an electrical outlet. Otherwise you may damage the power supply or the printer.

If the power supply's rated voltage and your outlet's voltage do not match, contact your dealer for assistance. Do not plug in the power cord. Otherwise, you may damage the power supply or the printer.

1. Make sure the printer is turned off.
2. Pull the hole of the Cover-Wire to separate from the printer.
3. Plug the DC cord connector into the power jack on the printer.
4. If it is necessary to connect the interface, plug the interface connector into the interface port on the printer.
5. If it is necessary to connect the drawer, plug the drawer connector into the drawer port on the printer.
6. Put the two hooks into the two holes of the Case-Lower backward and close the Cover-Wire until it locks firmly.
7. Plug the AC Adapter power cord into the wall outlet.

NOTES : If you want to turn the TP-3020 off, press and hold the power button until the POWER LED is off.

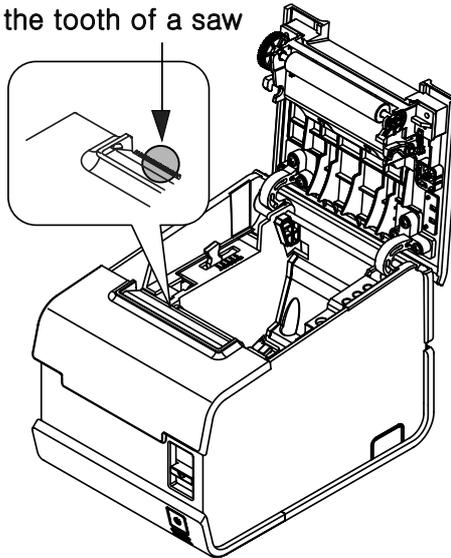
NOTES : To remove the DC cable connector, make sure that the power supply's power cord is unplugged; then grasp the connector at the arrow and pull it straight out.



1-6. Installing or Replacing the Paper Roll

CAUTION : When the printer lid is raised the serrated edge of the paper tear bar is also accessible, Care should be taken with the serrated edge.

the tooth of a saw

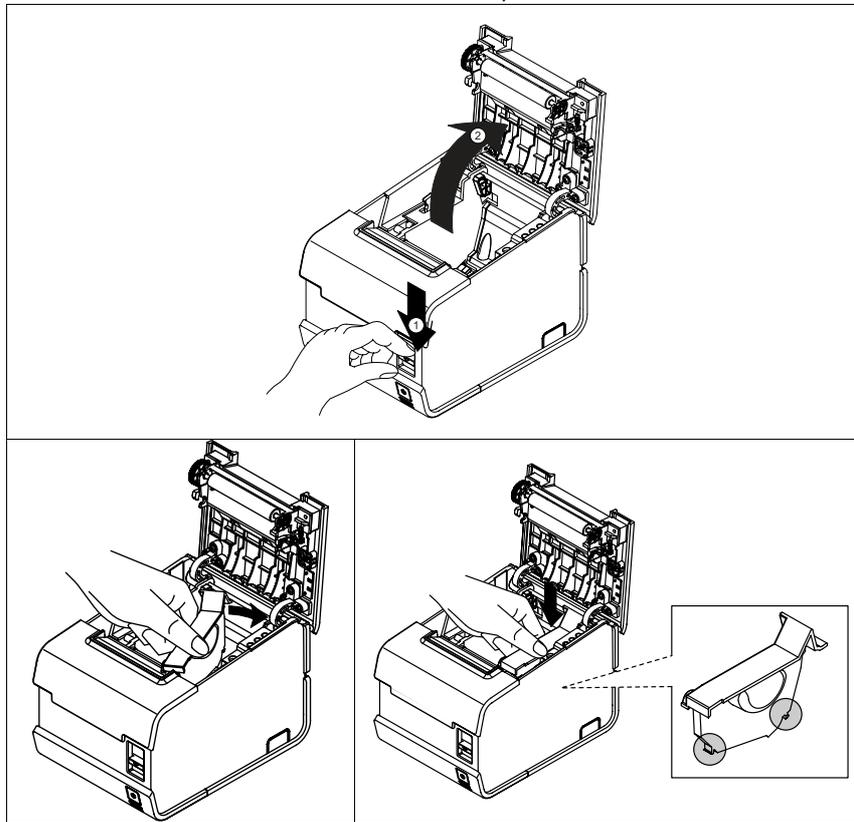


1-6-1. Partition Installation

NOTES : The Paper partition is dealer option item.

You can install the partition for 58mm paper printing on TP-3020.

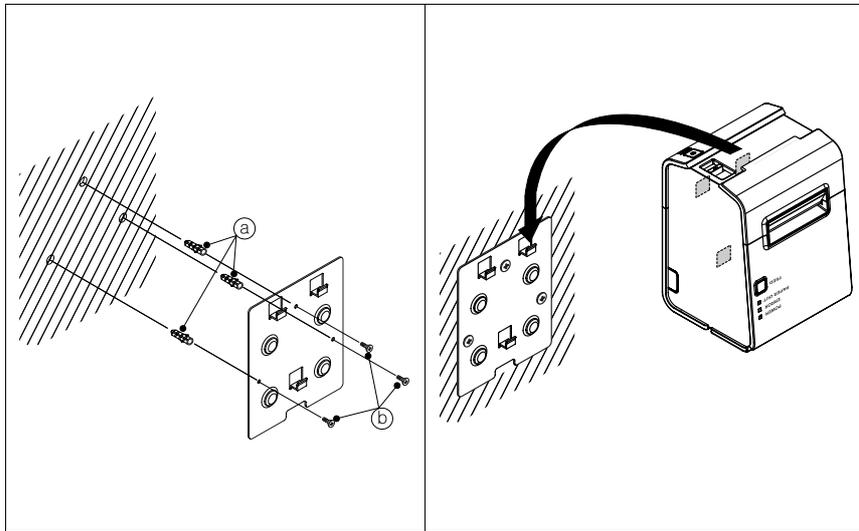
1. Push the Open-Button and open the Cover-Open.
2. Insert the Partition into the Paper-Supply as shown.
3. Push the Partition until the two hook locks firmly.



1-6-2. Wall Mount Installation

NOTES : Wall mount bracket is dealer option item.

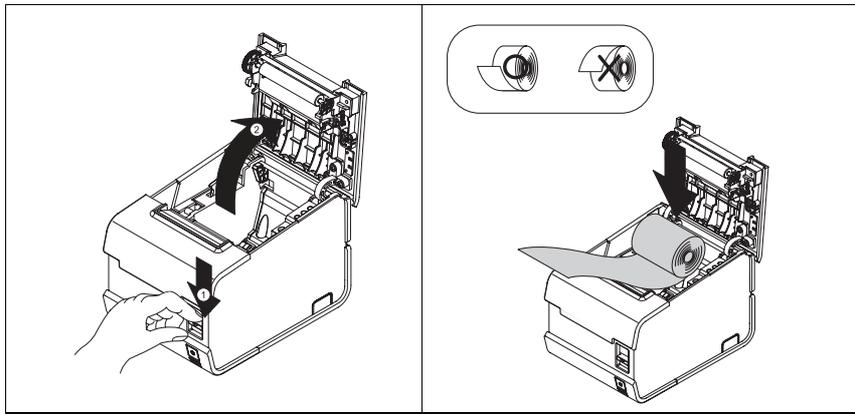
1. Drill the wall to make the three holes ϕ 6.5mm, depth over 35mm and put the three anchors **a** into the each hole. (Notice the position of the holes.)
2. Tighten the three screws **b** into the each anchor to fix the BRKT-Wall to the wall as shown.
3. Hang the printer on the three hooks and fix it down.



1-6-3. Paper Roll Installation

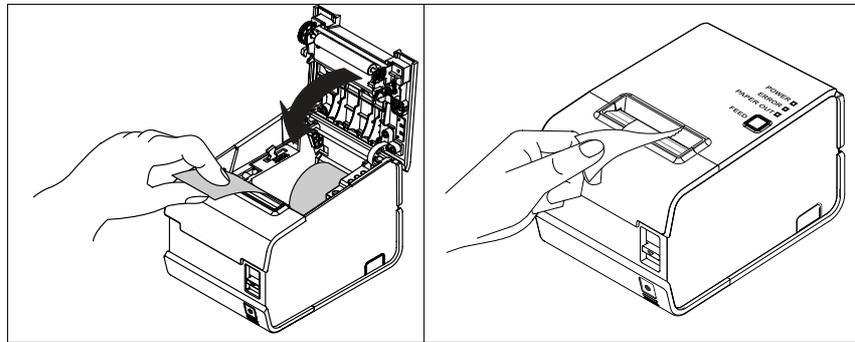
NOTES : Be sure to use paper rolls that meet the specifications. Do not use paper rolls that have the paper glued to the core because the printer cannot detect the paper end correctly.

1. Open the paper roll cover by pressing the cover-open button.



2. Remove the used paper roll core if there is one.

3. Insert the paper roll as shown.



4. Be sure to note the correct direction that the paper comes off the roll.

5. Pull out a small amount of paper, as shown. Then close the cover.

6. Tear off the paper as shown.

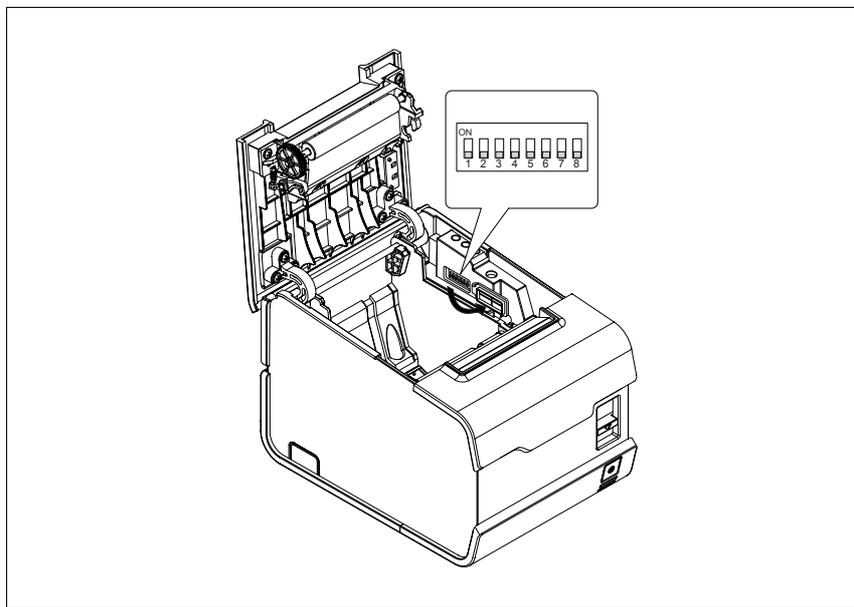
1-7. Adjustments and Settings

The TP-3020 is set up at the factory to be appropriate for almost all users. It does, however, offer some settings for users with special requirements.

It has DIP switches that allow you to change communication settings, such as handshaking and parity check, as well as printing density.

The TP-3020 also has a near-end sensor for the paper. This can give you a warning when the paper is almost out. If you find that there is not enough paper remaining on the roll when the near-end detector is triggered, you can change the near-end sensor setting.

See the next page if you need to make any of these changes.



NOTES : Always change DIP switch settings only when the printer is turned off. Change made with the power on have no effect until the powered off and then on again.

1-7-1. Serial Interface Specification

■ DIP Switch Set 1 Functions

| SW | FUNCTION | ON | OFF | DEFAULT |
|----|---------------------|------------------------------|--------------|---------|
| 1 | Handshaking | XON/XOFF | DSR/DTR | OFF |
| 2 | Word Length | 7Bit | 8Bit | OFF |
| 3 | Parity Check | Yes | No | OFF |
| 4 | Parity Selection | EVEN | ODD | OFF |
| 5 | Baud rate selection | Refer to the Following Table | | OFF |
| 6 | | | | OFF |
| 7 | | | | OFF |
| 8 | Dip Switch Select | Dip Switch 2 | Dip Switch 1 | - |

◆ Baud rate selection

| Transmission speed | SW – 5 | SW – 6 | SW – 7 | Remark |
|--------------------|--------|--------|--------|---------|
| 2400 baud | ON | ON | ON | - |
| 4800 baud | ON | ON | OFF | - |
| 9600 baud | ON | OFF | ON | - |
| 14400 baud | ON | OFF | OFF | - |
| 19200 baud | OFF | ON | ON | - |
| 38400 baud | OFF | ON | OFF | - |
| 57600 baud | OFF | OFF | ON | - |
| 115200 baud | OFF | OFF | OFF | Default |

■ Dip Switch Set 2 Functions

| SW | FUNCTION | ON | OFF | DEFAULT |
|----|----------------------|------------------------------|---------------|--------------------|
| 1 | Mode Selection | STAR | EPSON | OFF |
| 2 | *Kitchen Bell | Enable | Disable | OFF |
| 3 | Auto Cutter | Disable | Enable | OFF |
| 4 | Self Test | Hexa Dump | SelfTest Mode | OFF |
| 5 | Select Print Density | Refer to the Following Table | | OFF |
| 6 | | | | OFF |
| 7 | | | | Data Receive Error |
| 8 | Dip Switch Select | Dip Switch 2 | Dip Switch 1 | - |

*Kitchen Bell is option.

◆ Print Density

| Print Density | SW - 5 | SW – 6 | Remark |
|---------------|--------|--------|---------|
| 1 (Light) | ON | ON | - |
| 2 | OFF | OFF | Default |
| 3 | ON | OFF | - |
| 4 (Dark) | OFF | ON | - |

1-7-2. Parallel Interface Specification

■ Dip Switch Set 1 Functions

| SW | FUNCTION | ON | OFF | DEFAULT |
|----|-------------------|--------------|--------------|---------|
| 1 | Reserved | - | - | - |
| 2 | Reserved | - | - | - |
| 3 | Reserved | - | - | - |
| 4 | Reserved | - | - | - |
| 5 | Reserved | - | - | - |
| 6 | Reserved | - | - | - |
| 7 | Reserved | - | - | - |
| 8 | Dip Switch Select | Dip Switch 2 | Dip Switch 1 | - |

■ Dip Switch Set 2 Functions

| SW | FUNCTION | ON | OFF | DEFAULT |
|----|----------------------|------------------------------|---------------|---------|
| 1 | Mode Selection | STAR | EPSON | OFF |
| 2 | *Kitchen Bell | Enable | Disable | OFF |
| 3 | Auto Cutter | Disable | Enable | OFF |
| 4 | Self Test | Hexa Dump | SelfTest Mode | OFF |
| 5 | Select Print Density | Refer to the Following Table | | OFF |
| 6 | | | | OFF |
| 7 | Data Receive Error | Ignore | Print "?" | OFF |
| 8 | Dip Switch Select | Dip Switch 2 | Dip Switch 1 | - |

*Kitchen Bell is option.

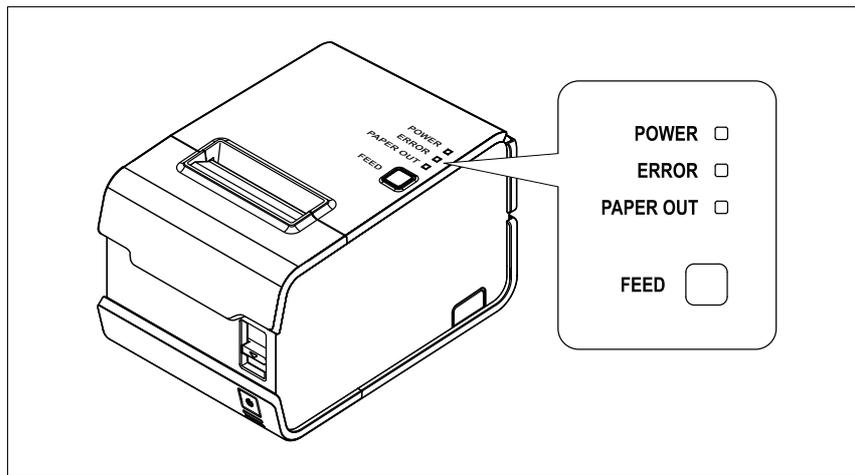
◆ Print Density

| Print Density | SW - 5 | SW - 6 | Remark |
|---------------|--------|--------|---------|
| 1 (Light) | ON | ON | - |
| 2 | OFF | OFF | Default |
| 3 | ON | OFF | - |
| 4 (Dark) | OFF | ON | - |

1-8. Using the Printer

You can control the basic paper feeding operations of the printer with the button on the control panel. The indicator lights help you monitor the printer's status.

1-8-1. Control Panel



● Feed Button

The button can be disabled by the **ESC c 5** command.

Press the FEED button once to advance paper one line. You can also hold down the FEED button to feed paper continuously.

● Panel lights : LED (Color)

POWER (GREEN)

The POWER light is "ON" whenever the printer is "ON".

ERROR (RED)

This indicates an error. See **APPENDIX F**<Page 51> for information of what to do when this light comes on.

NO PAPER (RED)

This light indicates the near end of the paper roll. Install a new paper roll and the printer will continue printing.

When the light blinks, it indicates the self-test printing standby state or macro execution standby state when the macro execution command is used.

Chapter 2. Hexadecimal Dumping

This feature allows the experienced users to see exactly what data is coming to the printer. This can be useful in finding software problems. When you turn on the hexadecimal dump function, the printer prints all commands and data in hexadecimal format along with a guide section to help you find specific commands.

To use the hexadecimal dump function, follow these steps:

1. After you make sure that the printer is off.
2. Make sure DIP switch 2-4 to ON for Hexadecimal dumping mode.
3. Turn on the power while pressing the FEED button or executing **GS (A** command; then the printer prints "HEXADECIMAL DUMP MODE ..." on the paper roll and enter the hexadecimal dump mode.
4. Run any software program that sends data to the printer. The printer will print all the codes it receives in a two-column format. The first column contains the hexadecimal codes and the second column gives the ASCII characters that correspond to the codes.

HEXADECIMAL DUMP MODE
PRESS PAPER FEED BUTTON THREE
TIMES TO EXIT DUMP MODE

```
1D 57 00 02 1D 48 02 42 61 72 .W...H.Bar  
43 6F 64 65 20 50 72 69 6E 74 Code Print  
69 6E 67 0A 0A 1D 6B 00 31 32 ing...K.12
```

- A period (.) is printed for each code that has no ASCII equivalent.
- During the hexadecimal dump, all commands except **DLE EOT** and **DLE ENQ** are disabled.

5. When the printing finishes, turn off the printer or press the FEED button three times, and then change DIP switch 2-4 to OFF (Self-Test mode).
6. Turn on the printer and then the hexadecimal mode is off.

Chapter 3. The self test

The self-test checks whether the printer has any problems. If the printer does not function properly, contact your dealer. The self-test checks are as follows;

1. Make sure paper roll has been installed properly.
2. Turn on the power while holding down the FEED button. The self-test begins.
3. The self-test prints the current printer status, which provides the control ROM version and the DIP switch setting.
4. After printing the current printer status, self-test printing will print the following, and pause (The PAPER LED light blinks).

SELF TEST PRINTING.

PLEASE PRESS PAPER FEED BUTTON.

5. Press the FEED button to continue printing. The printer prints a pattern using the built-in character set.
6. The self-test automatically ends and cuts the paper after printing the following.

**** End Self-Test ****

The printer is ready to receive data as soon as it completes the self-test.

Chapter 4. Code Table

The following pages show the character code tables. To find the character corresponding to a hexadecimal number, count across the top of the table for the left digit and count down the left column of the table for the right digit. For example, 4A = J.

| HEX | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----|-----|-----|----|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | NUL | DLE | SP | 0 | @ | P | ` | p | Ç | É | á | ⋮ | Ł | ł | α | ≡ |
| 1 | ␣ | ␣ | ! | 1 | A | Q | a | q | ü | æ | í | ⋮ | ł | ł | β | ± |
| 2 | ␣ | ␣ | " | 2 | B | R | b | r | é | Æ | ó | ⋮ | ł | ł | Γ | ≥ |
| 3 | ␣ | ␣ | # | 3 | C | S | c | s | â | ô | ú | ⋮ | ł | ł | π | ≤ |
| 4 | EOT | DC4 | \$ | 4 | D | T | d | t | ä | ö | ñ | ⋮ | ł | ł | Σ | ∫ |
| 5 | ENQ | ␣ | % | 5 | E | U | e | u | à | ò | ñ | ⋮ | ł | ł | σ | ∫ |
| 6 | ␣ | ␣ | & | 6 | F | V | f | v | á | ù | ª | ⋮ | ł | ł | μ | ÷ |
| 7 | ␣ | ␣ | ' | 7 | G | W | g | w | ç | ù | ª | ⋮ | ł | ł | τ | ≈ |
| 8 | ␣ | CAN | (| 8 | H | X | h | x | ê | ÿ | ¿ | ⋮ | ł | ł | Φ | ° |
| 9 | HT | ␣ |) | 9 | I | Y | i | y | ë | Ö | ƒ | ⋮ | ł | ł | Θ | • |
| A | LF | ␣ | * | : | J | Z | j | z | è | Ü | ƒ | ⋮ | ł | ł | Ω | • |
| B | ␣ | ESC | + | ; | K | [| k | { | ï | € | ¼ | ⋮ | ł | ł | δ | √ |
| C | FF | FS | , | < | L | \ | l | | î | £ | ½ | ⋮ | ł | ł | ∞ | ∞ |
| D | CR | GS | . | = | M |] | m | } | ì | ¥ | ¾ | ⋮ | ł | ł | φ | ? |
| E | ␣ | ␣ | > | > | N | ^ | n | ~ | Ë | ƒ | » | ⋮ | ł | ł | ε | ■ |
| F | ␣ | ␣ | / | ? | O | - | o | ~ | À | f | » | ⋮ | ł | ł | ∩ | ■ |

| | HEX | 8 | 9 | A | B | C | D | E | F |
|-----|------|-------|-------|--------|-------|-------|-------|-------|--------|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | ー 128 | 丄 144 | SP 160 | ー 176 | 夕 192 | ミ 208 | 一 224 | × 240 |
| 1 | 0001 | ー 129 | 丅 145 | 。 161 | ア 177 | チ 193 | ム 209 | ト 225 | 円 241 |
| 2 | 0010 | ■ 130 | ┆ 146 | 「 162 | イ 178 | ツ 194 | メ 210 | 十 226 | 年 242 |
| 3 | 0011 | ■ 131 | ┆ 147 | 」 163 | ウ 179 | テ 195 | モ 211 | 十 227 | 月 243 |
| 4 | 0100 | ■ 132 | ┆ 148 | 、 164 | エ 180 | ト 196 | ヤ 212 | ▲ 228 | 日 244 |
| 5 | 0101 | ■ 133 | ー 149 | ・ 165 | オ 181 | ナ 197 | ユ 213 | ▲ 229 | 時 245 |
| 6 | 0110 | ■ 134 | ┆ 150 | ヲ 166 | カ 182 | ニ 198 | ヨ 214 | ▲ 230 | 分 246 |
| 7 | 0111 | ┆ 135 | ┆ 151 | ア 167 | キ 183 | ヌ 199 | ラ 215 | ▲ 231 | 秒 247 |
| 8 | 1000 | ┆ 136 | ┆ 152 | イ 168 | ク 184 | ネ 200 | リ 216 | ♠ 232 | 〒 248 |
| 9 | 1001 | ┆ 137 | ┆ 153 | ウ 169 | ケ 185 | ノ 201 | ル 217 | ♥ 233 | 市 249 |
| A | 1010 | ┆ 138 | ┆ 154 | エ 170 | コ 186 | ハ 202 | レ 218 | ♦ 234 | 区 250 |
| B | 1011 | ■ 139 | ┆ 155 | オ 171 | サ 187 | ヒ 203 | ロ 219 | ♣ 235 | 町 251 |
| C | 1100 | ■ 140 | ┆ 156 | ヤ 172 | シ 188 | フ 204 | リ 220 | ● 236 | 村 252 |
| D | 1101 | ■ 141 | ゝ 157 | ユ 173 | ス 189 | ヘ 205 | ソ 221 | ○ 237 | 人 253 |
| E | 1110 | ■ 142 | ゝ 158 | ヨ 174 | セ 190 | ホ 206 | テ 222 | ／ 238 | ☑ 254 |
| F | 1111 | ┆ 143 | ゝ 159 | ツ 175 | ソ 191 | マ 207 | 。 223 | ＼ 239 | SP 255 |

Page 1 (Katakana)

| | HEX | 8 | 9 | A | B | C | D | E | F |
|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | Ç 128 | É 144 | á 160 | ☼ 176 | Ł 192 | ð 208 | Ó 224 | - 240 |
| 1 | 0001 | ü 129 | æ 145 | í 161 | ☼ 177 | ⊥ 193 | Đ 209 | ß 225 | ± 241 |
| 2 | 0010 | é 130 | Æ 146 | ó 162 | ☼ 178 | ⊥ 194 | Ê 210 | Ô 226 | = 242 |
| 3 | 0011 | â 131 | ô 147 | ú 163 | 179 | ⊥ 195 | Ë 211 | Ò 227 | ‡ 243 |
| 4 | 0100 | ä 132 | ö 148 | ñ 164 | 180 | - 196 | È 212 | õ 228 | ¶ 244 |
| 5 | 0101 | à 133 | ò 149 | Ñ 165 | Á 181 | † 197 | ı 213 | Õ 229 | § 245 |
| 6 | 0110 | å 134 | û 150 | ä 166 | Â 182 | ã 198 | Í 214 | μ 230 | ÷ 246 |
| 7 | 0111 | ç 135 | ù 151 | ø 167 | À 183 | Ã 199 | Î 215 | þ 231 | · 247 |
| 8 | 1000 | ê 136 | ÿ 152 | ı 168 | © 184 | Ł 200 | İ 216 | Ɔ 232 | ° 248 |
| 9 | 1001 | ë 137 | Ö 153 | ® 169 | ¶ 185 | ŕ 201 | Ј 217 | Ú 233 | ¨ 249 |
| A | 1010 | è 138 | Ü 154 | ¬ 170 | ¶ 186 | Ł 202 | ŕ 218 | Û 234 | · 250 |
| B | 1011 | ï 139 | ø 155 | ½ 171 | ¶ 187 | ŕ 203 | ■ 219 | Ü 235 | ¹ 251 |
| C | 1100 | î 140 | £ 156 | ¼ 172 | ¶ 188 | ŕ 204 | ■ 220 | Ý 236 | ³ 252 |
| D | 1101 | ì 141 | Ø 157 | ı 173 | ¢ 189 | = 205 | ı 221 | Ÿ 237 | ² 253 |
| E | 1110 | Ä 142 | × 158 | « 174 | ¥ 190 | ¶ 206 | İ 222 | - 238 | ■ 254 |
| F | 1111 | Å 143 | f 159 | » 175 | ƒ 191 | ¶ 207 | ■ 223 | ´ 239 | 255 |

| | HEX | 8 | 9 | A | B | C | D | E | F |
|-----|------|----------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | Ç <small>128</small> | É <small>144</small> | á <small>160</small> | ☐ <small>176</small> | Ł <small>192</small> | Ɑ <small>208</small> | α <small>224</small> | ≡ <small>240</small> |
| 1 | 0001 | ü <small>129</small> | À <small>145</small> | í <small>161</small> | ☐ <small>177</small> | ⊥ <small>193</small> | ƒ <small>209</small> | β <small>225</small> | ± <small>241</small> |
| 2 | 0010 | é <small>130</small> | È <small>146</small> | ó <small>162</small> | ☐ <small>178</small> | Ƨ <small>194</small> | π <small>210</small> | Γ <small>226</small> | ≥ <small>242</small> |
| 3 | 0011 | â <small>131</small> | ô <small>147</small> | ú <small>163</small> | <small>179</small> | ⊔ <small>195</small> | Ɱ <small>211</small> | π <small>227</small> | ≤ <small>243</small> |
| 4 | 0100 | ã <small>132</small> | õ <small>148</small> | ñ <small>164</small> | ⊥ <small>180</small> | − <small>196</small> | Ɐ <small>212</small> | Σ <small>228</small> | ∫ <small>244</small> |
| 5 | 0101 | à <small>133</small> | ò <small>149</small> | Ñ <small>165</small> | ⊥ <small>181</small> | ⊕ <small>197</small> | Ƒ <small>213</small> | σ <small>229</small> | ∫ <small>245</small> |
| 6 | 0110 | Á <small>134</small> | Ú <small>150</small> | a <small>166</small> | ⱪ <small>182</small> | ƒ <small>198</small> | π <small>214</small> | μ <small>230</small> | ÷ <small>246</small> |
| 7 | 0111 | ç <small>135</small> | ù <small>151</small> | o <small>167</small> | π <small>183</small> | ⱪ <small>199</small> | Ⱬ <small>215</small> | τ <small>231</small> | ≈ <small>247</small> |
| 8 | 1000 | ê <small>136</small> | Ì <small>152</small> | ı <small>168</small> | Ƨ <small>184</small> | ⱬ <small>200</small> | ⱬ <small>216</small> | Φ <small>232</small> | ° <small>248</small> |
| 9 | 1001 | Ê <small>137</small> | Õ <small>153</small> | Ò <small>169</small> | ⱪ <small>185</small> | Ƨ <small>201</small> | ∫ <small>217</small> | Θ <small>233</small> | • <small>249</small> |
| A | 1010 | è <small>138</small> | Û <small>154</small> | ¬ <small>170</small> | ⱪ <small>186</small> | ⱬ <small>202</small> | Ƨ <small>218</small> | Ω <small>234</small> | • <small>250</small> |
| B | 1011 | Í <small>139</small> | ç <small>155</small> | ½ <small>171</small> | Ƨ <small>187</small> | ƒ <small>203</small> | ■ <small>219</small> | δ <small>235</small> | √ <small>251</small> |
| C | 1100 | Ô <small>140</small> | £ <small>156</small> | ¼ <small>172</small> | ⱪ <small>188</small> | ⱪ <small>204</small> | ■ <small>220</small> | ∞ <small>236</small> | n <small>252</small> |
| D | 1101 | ì <small>141</small> | Û <small>157</small> | ı <small>173</small> | ⱪ <small>189</small> | = <small>205</small> | ■ <small>221</small> | φ <small>237</small> | ² <small>253</small> |
| E | 1110 | Ã <small>142</small> | Pt <small>158</small> | « <small>174</small> | ⱪ <small>190</small> | ⱪ <small>206</small> | ■ <small>222</small> | ε <small>238</small> | ■ <small>254</small> |
| F | 1111 | Â <small>143</small> | Ó <small>159</small> | » <small>175</small> | Ƨ <small>191</small> | ⊥ <small>207</small> | ■ <small>223</small> | ∩ <small>239</small> | <small>255</small> |

| | HEX | 8 | 9 | A | B | C | D | E | F |
|-----|------|---|---|---|---|---|---|---|---|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | Ç 128 | É 144 | ı 160 | ⋮ 176 | Ł 192 | ⋈ 208 | α 224 | ≡ 240 |
| 1 | 0001 | ü 129 | È 145 | ´ 161 | ⋮ 177 | ⊥ 193 | ⌒ 209 | β 225 | ± 241 |
| 2 | 0010 | é 130 | Ê 146 | ó 162 | ⋮ 178 | ⌈ 194 | ⌒ 210 | Γ 226 | ≥ 242 |
| 3 | 0011 | â 131 | ô 147 | ú 163 | 179 | ⌈ 195 | ⋈ 211 | π 227 | ≤ 243 |
| 4 | 0100 | Â 132 | Ë 148 | ¨ 164 | † 180 | – 196 | ⋈ 212 | Σ 228 | ∫ 244 |
| 5 | 0101 | à 133 | Ï 149 | ˆ 165 | ‡ 181 | † 197 | ƒ 213 | σ 229 | ∫ 245 |
| 6 | 0110 | ¶ 134 | û 150 | ³ 166 | ‡ 182 | ƒ 198 | π 214 | μ 230 | ÷ 246 |
| 7 | 0111 | ç 135 | ù 151 | ˘ 167 | π 183 | ‡ 199 | ‡ 215 | τ 231 | ≈ 247 |
| 8 | 1000 | ê 136 | ı 152 | î 168 | ƒ 184 | ⋈ 200 | ‡ 216 | Φ 232 | ° 248 |
| 9 | 1001 | ë 137 | Ô 153 | ˘ 169 | ‡ 185 | ƒ 201 | ∫ 217 | Θ 233 | • 249 |
| A | 1010 | è 138 | Û 154 | ˘ 170 | ‡ 186 | ⋈ 202 | ƒ 218 | Ω 234 | • 250 |
| B | 1011 | ï 139 | ç 155 | ½ 171 | ƒ 187 | ⌒ 203 | ■ 219 | δ 235 | √ 251 |
| C | 1100 | î 140 | £ 156 | ¼ 172 | ∫ 188 | ‡ 204 | ■ 220 | ∞ 236 | ⁿ 252 |
| D | 1101 | = 141 | Û 157 | ¾ 173 | ∫ 189 | = 205 | ■ 221 | φ 237 | ² 253 |
| E | 1110 | À 142 | Û 158 | « 174 | ∫ 190 | ‡ 206 | ■ 222 | ε 238 | ■ 254 |
| F | 1111 | § 143 | f 159 | » 175 | ∫ 191 | ⊥ 207 | ■ 223 | ∩ 239 | 255 |

| | HEX | 8 | 9 | A | B | C | D | E | F |
|-----|------|---|--|---|--|--|--|---|---|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | Ç 128 | É 144 | á 160 | 176 | L 192 | ll 208 | α 224 | ≡ 240 |
| 1 | 0001 | ü 129 | æ 145 | í 161 | 177 | ⊥ 193 | ƒ 209 | β 225 | ± 241 |
| 2 | 0010 | é 130 | Æ 146 | ó 162 | 178 | T 194 | π 210 | Γ 226 | ≥ 242 |
| 3 | 0011 | â 131 | ô 147 | ú 163 | 179 | † 195 | ll 211 | π 227 | ≤ 243 |
| 4 | 0100 | ä 132 | ö 148 | ñ 164 | † 180 | – 196 | ll 212 | Σ 228 | ∫ 244 |
| 5 | 0101 | à 133 | ò 149 | Ñ 165 | † 181 | † 197 | F 213 | σ 229 | ∫ 245 |
| 6 | 0110 | å 134 | û 150 | a 166 | ll 182 | † 198 | π 214 | μ 230 | ÷ 246 |
| 7 | 0111 | ç 135 | ù 151 | o 167 | π 183 | ll 199 | ll 215 | τ 231 | ≈ 247 |
| 8 | 1000 | ê 136 | ÿ 152 | ı 168 | ƒ 184 | ll 200 | † 216 | Φ 232 | ° 248 |
| 9 | 1001 | ë 137 | Ö 153 | ƒ 169 | ll 185 | ƒ 201 | J 217 | Θ 233 | • 249 |
| A | 1010 | è 138 | Ü 154 | ƒ 170 | ll 186 | ll 202 | ƒ 218 | Ω 234 | • 250 |
| B | 1011 | ï 139 | ø 155 | ½ 171 | ƒ 187 | ƒ 203 | ■ 219 | δ 235 | √ 251 |
| C | 1100 | î 140 | £ 156 | ¼ 172 | ll 188 | ll 204 | ■ 220 | ∞ 236 | n 252 |
| D | 1101 | ì 141 | Ø 157 | ı 173 | ll 189 | = 205 | ■ 221 | φ 237 | ² 253 |
| E | 1110 | Ä 142 | Pt 158 | « 174 | ∫ 190 | ll 206 | ■ 222 | ε 238 | ■ 254 |
| F | 1111 | Å 143 | f 159 | π 175 | ƒ 191 | ⊥ 207 | ■ 223 | ∩ 239 | 255 |

| | HEX | 8 | 9 | A | B | C | D | E | F |
|-----|------|-----------------------|-----------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | € <small>128</small> | SP <small>144</small> | SP <small>160</small> | ° <small>176</small> | À <small>192</small> | Ð <small>208</small> | à <small>224</small> | ð <small>240</small> |
| 1 | 0001 | SP <small>129</small> | ‘ <small>145</small> | í <small>161</small> | ± <small>177</small> | Á <small>193</small> | Ñ <small>209</small> | á <small>225</small> | ñ <small>241</small> |
| 2 | 0010 | , <small>130</small> | ’ <small>146</small> | ¢ <small>162</small> | ² <small>178</small> | Â <small>194</small> | Ò <small>210</small> | â <small>226</small> | ò <small>242</small> |
| 3 | 0011 | ƒ <small>131</small> | “ <small>147</small> | £ <small>163</small> | ³ <small>179</small> | Ã <small>195</small> | Ó <small>211</small> | ã <small>227</small> | ó <small>243</small> |
| 4 | 0100 | ” <small>132</small> | ” <small>148</small> | ¤ <small>164</small> | ´ <small>180</small> | Ä <small>196</small> | Ô <small>212</small> | ä <small>228</small> | ô <small>244</small> |
| 5 | 0101 | … <small>133</small> | • <small>149</small> | ¥ <small>165</small> | µ <small>181</small> | Å <small>197</small> | Õ <small>213</small> | å <small>229</small> | õ <small>245</small> |
| 6 | 0110 | † <small>134</small> | — <small>150</small> | ¡ <small>166</small> | ¶ <small>182</small> | Æ <small>198</small> | Ö <small>214</small> | æ <small>230</small> | ö <small>246</small> |
| 7 | 0111 | ‡ <small>135</small> | — <small>151</small> | § <small>167</small> | · <small>183</small> | Ç <small>199</small> | × <small>215</small> | ç <small>231</small> | ÷ <small>247</small> |
| 8 | 1000 | ^ <small>136</small> | ~ <small>152</small> | ¨ <small>168</small> | ˘ <small>184</small> | È <small>200</small> | Ø <small>216</small> | è <small>232</small> | ø <small>248</small> |
| 9 | 1001 | ‰ <small>137</small> | ™ <small>153</small> | © <small>169</small> | ¹ <small>185</small> | É <small>201</small> | Ù <small>217</small> | é <small>233</small> | ù <small>249</small> |
| A | 1010 | Š <small>138</small> | š <small>154</small> | ª <small>170</small> | º <small>186</small> | Ê <small>202</small> | Ú <small>218</small> | ê <small>234</small> | ú <small>250</small> |
| B | 1011 | < <small>139</small> | > <small>155</small> | « <small>171</small> | » <small>187</small> | Ë <small>203</small> | Û <small>219</small> | ë <small>235</small> | û <small>251</small> |
| C | 1100 | Œ <small>140</small> | œ <small>156</small> | ¬ <small>172</small> | ¼ <small>188</small> | Ì <small>204</small> | Ü <small>220</small> | ì <small>236</small> | ü <small>252</small> |
| D | 1101 | SP <small>141</small> | SP <small>157</small> | - <small>173</small> | ½ <small>189</small> | Í <small>205</small> | Ý <small>221</small> | í <small>237</small> | ý <small>253</small> |
| E | 1110 | Ž <small>142</small> | ž <small>158</small> | ® <small>174</small> | ¾ <small>190</small> | Î <small>206</small> | Þ <small>222</small> | î <small>238</small> | þ <small>254</small> |
| F | 1111 | SP <small>143</small> | ÿ <small>159</small> | - <small>175</small> | ¿ <small>191</small> | Ï <small>207</small> | ß <small>223</small> | ï <small>239</small> | ÿ <small>255</small> |

| | HEX | 8 | 9 | A | B | C | D | E | F |
|-----|------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | А <small>128</small> | Р <small>144</small> | а <small>160</small> | ␣ <small>176</small> | Л <small>192</small> | л <small>208</small> | р <small>224</small> | ё <small>240</small> |
| 1 | 0001 | Б <small>129</small> | С <small>145</small> | б <small>161</small> | ␣ <small>177</small> | ⊥ <small>193</small> | т <small>209</small> | с <small>225</small> | ё <small>241</small> |
| 2 | 0010 | В <small>130</small> | Т <small>146</small> | в <small>162</small> | ␣ <small>178</small> | т <small>194</small> | п <small>210</small> | т <small>226</small> | € <small>242</small> |
| 3 | 0011 | Г <small>131</small> | У <small>147</small> | г <small>163</small> | ␣ <small>179</small> | † <small>195</small> | л <small>211</small> | у <small>227</small> | € <small>243</small> |
| 4 | 0100 | Д <small>132</small> | Ф <small>148</small> | д <small>164</small> | ␣ <small>180</small> | — <small>196</small> | л <small>212</small> | ф <small>228</small> | ï <small>244</small> |
| 5 | 0101 | Е <small>133</small> | Х <small>149</small> | е <small>165</small> | ␣ <small>181</small> | † <small>197</small> | ф <small>213</small> | х <small>229</small> | ï <small>245</small> |
| 6 | 0110 | Ж <small>134</small> | Ц <small>150</small> | ж <small>166</small> | ␣ <small>182</small> | † <small>198</small> | п <small>214</small> | ц <small>230</small> | ÿ <small>246</small> |
| 7 | 0111 | З <small>135</small> | Ч <small>151</small> | з <small>167</small> | ␣ <small>183</small> | † <small>199</small> | † <small>215</small> | ч <small>231</small> | ÿ <small>247</small> |
| 8 | 1000 | И <small>136</small> | Ш <small>152</small> | и <small>168</small> | ␣ <small>184</small> | л <small>200</small> | † <small>216</small> | ш <small>232</small> | ° <small>248</small> |
| 9 | 1001 | Й <small>137</small> | Щ <small>153</small> | й <small>169</small> | ␣ <small>185</small> | л <small>201</small> | ␣ <small>217</small> | щ <small>233</small> | · <small>249</small> |
| A | 1010 | К <small>138</small> | Ъ <small>154</small> | к <small>170</small> | ␣ <small>186</small> | л <small>202</small> | л <small>218</small> | ъ <small>234</small> | · <small>250</small> |
| B | 1011 | Л <small>139</small> | Ы <small>155</small> | л <small>171</small> | ␣ <small>187</small> | т <small>203</small> | ■ <small>219</small> | ы <small>235</small> | √ <small>251</small> |
| C | 1100 | М <small>140</small> | Ь <small>156</small> | м <small>172</small> | ␣ <small>188</small> | † <small>204</small> | ■ <small>220</small> | ь <small>236</small> | № <small>252</small> |
| D | 1101 | Н <small>141</small> | Э <small>157</small> | н <small>173</small> | ␣ <small>189</small> | = <small>205</small> | ␣ <small>221</small> | э <small>237</small> | α <small>253</small> |
| E | 1110 | О <small>142</small> | Ю <small>158</small> | о <small>174</small> | ␣ <small>190</small> | † <small>206</small> | ␣ <small>222</small> | ю <small>238</small> | ■ <small>254</small> |
| F | 1111 | П <small>143</small> | Я <small>159</small> | п <small>175</small> | ␣ <small>191</small> | ⊥ <small>207</small> | ■ <small>223</small> | я <small>239</small> | ■ <small>255</small> |

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| | HEX | 8 | 9 | A | B | C | D | E | F |
|-----|------|-------|-------|--------|-------|-------|-------|-------|-------|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | Ç 128 | É 144 | á 160 | ⌘ 176 | Ł 192 | đ 208 | Ó 224 | - 240 |
| 1 | 0001 | ü 129 | Ĺ 145 | í 161 | ⌘ 177 | Ł 193 | Đ 209 | Œ 225 | ˘ 241 |
| 2 | 0010 | é 130 | Í 146 | ó 162 | ⌘ 178 | Ł 194 | Ď 210 | Ô 226 | ˘ 242 |
| 3 | 0011 | â 131 | ô 147 | ú 163 | 179 | Ł 195 | Ë 211 | Ń 227 | ˘ 243 |
| 4 | 0100 | ä 132 | ö 148 | À 164 | ⌘ 180 | - 196 | ď 212 | ń 228 | ˘ 244 |
| 5 | 0101 | û 133 | Ɔ 149 | ą 165 | Á 181 | Ł 197 | Ň 213 | ň 229 | § 245 |
| 6 | 0110 | č 134 | Ɔ 150 | ž 166 | Â 182 | Ǻ 198 | í 214 | š 230 | ÷ 246 |
| 7 | 0111 | ç 135 | Š 151 | ž 167 | Ě 183 | Ǻ 199 | î 215 | š 231 | ˘ 247 |
| 8 | 1000 | ħ 136 | ś 152 | Ɔ 168 | Ş 184 | Ł 200 | ě 216 | Ŕ 232 | ° 248 |
| 9 | 1001 | ë 137 | Ö 153 | ę 169 | ⌘ 185 | Ł 201 | Ĵ 217 | Ú 233 | ˘ 249 |
| A | 1010 | Ő 138 | Ü 154 | SP 170 | ⌘ 186 | Ł 202 | ŕ 218 | ř 234 | ˘ 250 |
| B | 1011 | ő 139 | Ŧ 155 | ż 171 | ⌘ 187 | Ł 203 | ■ 219 | Ů 235 | ů 251 |
| C | 1100 | ı 140 | ț 156 | č 172 | ⌘ 188 | Ł 204 | ■ 220 | ý 236 | ř 252 |
| D | 1101 | ž 141 | Ł 157 | š 173 | Ž 189 | = 205 | Ŧ 221 | Ý 237 | ř 253 |
| E | 1110 | Ä 142 | × 158 | « 174 | ž 190 | ⌘ 206 | Ů 222 | ț 238 | ■ 254 |
| F | 1111 | Ć 143 | č 159 | » 175 | Ŧ 191 | ⌘ 207 | ■ 223 | ˘ 239 | ˘ 255 |

| | HEX | 8 | 9 | A | B | C | D | E | F |
|-----|------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | Ç <small>128</small> | É <small>144</small> | á <small>160</small> | ☼ <small>176</small> | Ł <small>192</small> | ð <small>208</small> | Ó <small>224</small> | - <small>240</small> |
| 1 | 0001 | ü <small>129</small> | æ <small>145</small> | í <small>161</small> | ☼ <small>177</small> | Ł <small>193</small> | Ð <small>209</small> | ß <small>225</small> | ± <small>241</small> |
| 2 | 0010 | é <small>130</small> | Æ <small>146</small> | ó <small>162</small> | ☼ <small>178</small> | Ŧ <small>194</small> | Ê <small>210</small> | Ô <small>226</small> | = <small>242</small> |
| 3 | 0011 | â <small>131</small> | ô <small>147</small> | ú <small>163</small> | <small>179</small> | Ŧ <small>195</small> | Ë <small>211</small> | Ò <small>227</small> | ‡ <small>243</small> |
| 4 | 0100 | ä <small>132</small> | ö <small>148</small> | ñ <small>164</small> | † <small>180</small> | - <small>196</small> | È <small>212</small> | õ <small>228</small> | ¶ <small>244</small> |
| 5 | 0101 | à <small>133</small> | ò <small>149</small> | Ñ <small>165</small> | Á <small>181</small> | † <small>197</small> | € <small>213</small> | Õ <small>229</small> | § <small>245</small> |
| 6 | 0110 | å <small>134</small> | û <small>150</small> | ä <small>166</small> | Â <small>182</small> | ã <small>198</small> | Í <small>214</small> | µ <small>230</small> | ÷ <small>246</small> |
| 7 | 0111 | ç <small>135</small> | ù <small>151</small> | º <small>167</small> | À <small>183</small> | Ã <small>199</small> | Î <small>215</small> | þ <small>231</small> | » <small>247</small> |
| 8 | 1000 | ê <small>136</small> | ÿ <small>152</small> | ¿ <small>168</small> | © <small>184</small> | Ł <small>200</small> | Ï <small>216</small> | Ɔ <small>232</small> | ° <small>248</small> |
| 9 | 1001 | ë <small>137</small> | Ö <small>153</small> | ® <small>169</small> | ‡ <small>185</small> | Ŧ <small>201</small> | Ĵ <small>217</small> | Ú <small>233</small> | ¨ <small>249</small> |
| A | 1010 | è <small>138</small> | Ü <small>154</small> | ¬ <small>170</small> | <small>186</small> | Ł <small>202</small> | Ŧ <small>218</small> | Û <small>234</small> | · <small>250</small> |
| B | 1011 | ï <small>139</small> | ø <small>155</small> | ½ <small>171</small> | Ŧ <small>187</small> | Ŧ <small>203</small> | ■ <small>219</small> | Ü <small>235</small> | ¹ <small>251</small> |
| C | 1100 | í <small>140</small> | £ <small>156</small> | ¼ <small>172</small> | Ŧ <small>188</small> | Ŧ <small>204</small> | ■ <small>220</small> | Ý <small>236</small> | ² <small>252</small> |
| D | 1101 | ì <small>141</small> | Ø <small>157</small> | ı <small>173</small> | ¢ <small>189</small> | = <small>205</small> | ı <small>221</small> | Ÿ <small>237</small> | ³ <small>253</small> |
| E | 1110 | Ä <small>142</small> | × <small>158</small> | « <small>174</small> | ¥ <small>190</small> | Ŧ <small>206</small> | Ï <small>222</small> | - <small>238</small> | ■ <small>254</small> |
| F | 1111 | Å <small>143</small> | f <small>159</small> | » <small>175</small> | Ŧ <small>191</small> | α <small>207</small> | ■ <small>223</small> | ´ <small>239</small> | 255 |

| | HEX | 8 | 9 | A | B | C | D | E | F |
|-----|------|-------|--------|-------|-------|-------|-------|-------|--------|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | • 128 | β 144 | 160 | • 176 | ٤ 192 | ذ 208 | - 224 | □ 240 |
| 1 | 0001 | • 129 | ∞ 145 | - 161 | ١ 177 | ٤ 193 | ر 209 | ف 225 | 241 |
| 2 | 0010 | • 130 | ∅ 146 | آ 162 | ٢ 178 | آ 194 | ز 210 | ق 226 | ن 242 |
| 3 | 0011 | √ 131 | ± 147 | £ 163 | ٣ 179 | أ 195 | س 211 | ك 227 | ه 243 |
| 4 | 0100 | ☼ 132 | ½ 148 | ⊝ 164 | ٤ 180 | و 196 | ش 212 | ل 228 | ه 244 |
| 5 | 0101 | - 133 | ¼ 149 | أ 165 | ٥ 181 | ع 197 | ص 213 | م 229 | ى 245 |
| 6 | 0110 | 134 | ≈ 150 | 166 | ٦ 182 | ن 198 | ض 214 | ن 230 | ي 246 |
| 7 | 0111 | † 135 | « 151 | 167 | ٧ 183 | ا 199 | ط 215 | ه 231 | غ 247 |
| 8 | 1000 | ‡ 136 | » 152 | ا 168 | ٨ 184 | ب 200 | ظ 216 | و 232 | ق 248 |
| 9 | 1001 | T 137 | لأ 153 | ب 169 | ٩ 185 | ة 201 | ع 217 | ى 233 | لا 249 |
| A | 1010 | ‡ 138 | لا 154 | ت 170 | ف 186 | ت 202 | غ 218 | ي 234 | لا 250 |
| B | 1011 | ‡ 139 | 155 | ث 171 | ؛ 187 | ث 203 | ا 219 | ض 235 | ل 251 |
| C | 1100 | ٦ 140 | 156 | ، 172 | س 188 | ج 204 | ٦ 220 | ع 236 | ك 252 |
| D | 1101 | ٦ 141 | لا 157 | ج 173 | ش 189 | ح 205 | ÷ 221 | غ 237 | ي 253 |
| E | 1110 | L 142 | لا 158 | ح 174 | ص 190 | خ 206 | × 222 | غ 238 | ■ 254 |
| F | 1111 | ل 143 | 159 | خ 175 | ؟ 191 | د 207 | ع 223 | م 239 | 255 |

| | HEX | 8 | 9 | A | B | C | D | E | F |
|-----|------|---|--|---|--|--|--|---|---|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | ! 128 | 4 144 | á 160 | 176 | L 192 | ll 208 | α 224 | ≡ 240 |
| 1 | 0001 | # 129 | ó 145 | í 161 | 177 | ⊥ 193 | ⌞ 209 | β 225 | ± 241 |
| 2 | 0010 | % 130 | 7 146 | ó 162 | 178 | T 194 | π 210 | Γ 226 | ≥ 242 |
| 3 | 0011 | ' 131 | : | ú 163 | 179 | ⊥ 195 | ll 211 | π 227 | ≤ 243 |
| 4 | 0100 | (132 | 9 148 | ñ 164 | ⊥ 180 | - 196 | ⊥ 212 | Σ 228 | ∫ 244 |
| 5 | 0101 |) 133 | < 149 | Ñ 165 | ⊥ 181 | ⊥ 197 | F 213 | σ 229 | ∫ 245 |
| 6 | 0110 | * 134 | ; | á 166 | ⊥ 182 | ⊥ 198 | π 214 | μ 230 | ÷ 246 |
| 7 | 0111 | + 135 | = 151 | ó 167 | π 183 | ⊥ 199 | ⊥ 215 | τ 231 | ≈ 247 |
| 8 | 1000 | , | > 152 | í 168 | ⊥ 184 | ll 200 | ⊥ 216 | Φ 232 | ° 248 |
| 9 | 1001 | - 137 | ? 153 | ⊥ 169 | ⊥ 185 | ⊥ 201 | ⊥ 217 | Θ 233 | • 249 |
| A | 1010 | 0 138 | B | ⊥ 170 | ll 186 | ll 202 | ⊥ 218 | Ω 234 | • 250 |
| B | 1011 | / 139 | ¢ 155 | ½ 171 | ⊥ 187 | ⊥ 203 | ■ 219 | δ 235 | √ 251 |
| C | 1100 | 1 140 | £ 156 | ¼ 172 | ⊥ 188 | ⊥ 204 | ■ 220 | ∞ 236 | ∞ 252 |
| D | 1101 | 3 141 | ¥ 157 | í 173 | ⊥ 189 | = 205 | ■ 221 | φ 237 | ² 253 |
| E | 1110 | 2 142 | Pt 158 | « 174 | ⊥ 190 | ⊥ 206 | ■ 222 | ε 238 | ■ 254 |
| F | 1111 | 5 143 | f 159 | » 175 | ⊥ 191 | ⊥ 207 | ■ 223 | ∩ 239 | 255 |

| | HEX | 8 | 9 | A | B | C | D | E | F |
|-----|------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | Α <u>128</u> | Ρ <u>144</u> | ι <u>160</u> | ☐ <u>176</u> | Λ <u>192</u> | ⊥ <u>208</u> | ω <u>224</u> | Ω <u>240</u> |
| 1 | 0001 | Β <u>129</u> | Σ <u>145</u> | κ <u>161</u> | ☐ <u>177</u> | ⊥ <u>193</u> | ⊥ <u>209</u> | ά <u>225</u> | ± <u>241</u> |
| 2 | 0010 | Γ <u>130</u> | Τ <u>146</u> | λ <u>162</u> | ☐ <u>178</u> | Τ <u>194</u> | Π <u>210</u> | έ <u>226</u> | ≥ <u>242</u> |
| 3 | 0011 | Δ <u>131</u> | Υ <u>147</u> | μ <u>163</u> | <u>179</u> | ⊥ <u>195</u> | ⊥ <u>211</u> | ή <u>227</u> | ≤ <u>243</u> |
| 4 | 0100 | Ε <u>132</u> | Φ <u>148</u> | ν <u>164</u> | ⊥ <u>180</u> | — <u>196</u> | ⊥ <u>212</u> | ϊ <u>228</u> | ϊ <u>244</u> |
| 5 | 0101 | Ζ <u>133</u> | Χ <u>149</u> | ξ <u>165</u> | ⊥ <u>181</u> | ⊥ <u>197</u> | ⊥ <u>213</u> | ί <u>229</u> | ÿ <u>245</u> |
| 6 | 0110 | Η <u>134</u> | Ψ <u>150</u> | ο <u>166</u> | ⊥ <u>182</u> | ⊥ <u>198</u> | Π <u>214</u> | ό <u>230</u> | ÷ <u>246</u> |
| 7 | 0111 | Θ <u>135</u> | Ω <u>151</u> | π <u>167</u> | ⊥ <u>183</u> | ⊥ <u>199</u> | ⊥ <u>215</u> | ύ <u>231</u> | ≈ <u>247</u> |
| 8 | 1000 | Ι <u>136</u> | α <u>152</u> | ρ <u>168</u> | ⊥ <u>184</u> | ⊥ <u>200</u> | ⊥ <u>216</u> | ϋ <u>232</u> | ° <u>248</u> |
| 9 | 1001 | Κ <u>137</u> | β <u>153</u> | ς <u>169</u> | ⊥ <u>185</u> | ⊥ <u>201</u> | ⊥ <u>217</u> | ώ <u>233</u> | • <u>249</u> |
| A | 1010 | Λ <u>138</u> | γ <u>154</u> | σ <u>170</u> | ⊥ <u>186</u> | ⊥ <u>202</u> | ⊥ <u>218</u> | Α <u>234</u> | • <u>250</u> |
| B | 1011 | Μ <u>139</u> | δ <u>155</u> | τ <u>171</u> | ⊥ <u>187</u> | ⊥ <u>203</u> | ⊥ <u>219</u> | Ε <u>235</u> | √ <u>251</u> |
| C | 1100 | Ν <u>140</u> | ε <u>156</u> | υ <u>172</u> | ⊥ <u>188</u> | ⊥ <u>204</u> | ⊥ <u>220</u> | Η <u>236</u> | ⁿ <u>252</u> |
| D | 1101 | Ξ <u>141</u> | ζ <u>157</u> | φ <u>173</u> | ⊥ <u>189</u> | = <u>205</u> | ⊥ <u>221</u> | Τ <u>237</u> | ² <u>253</u> |
| E | 1110 | Ο <u>142</u> | η <u>158</u> | χ <u>174</u> | ⊥ <u>190</u> | ⊥ <u>206</u> | ⊥ <u>222</u> | Ο <u>238</u> | ■ <u>254</u> |
| F | 1111 | Π <u>143</u> | θ <u>159</u> | ψ <u>175</u> | ⊥ <u>191</u> | ⊥ <u>207</u> | ⊥ <u>223</u> | Υ <u>239</u> | <u>255</u> |

| | HEX | 8 | 9 | A | B | C | D | E | F |
|-----|------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | SP <u>128</u> | SP <u>144</u> | SP <u>160</u> | SP <u>176</u> | SP <u>192</u> | SP <u>208</u> | SP <u>224</u> | SP <u>240</u> |
| 1 | 0001 | SP <u>129</u> | SP <u>145</u> | SP <u>161</u> | SP <u>177</u> | SP <u>193</u> | SP <u>209</u> | SP <u>225</u> | SP <u>241</u> |
| 2 | 0010 | SP <u>130</u> | SP <u>146</u> | SP <u>162</u> | SP <u>178</u> | SP <u>194</u> | SP <u>210</u> | SP <u>226</u> | SP <u>242</u> |
| 3 | 0011 | SP <u>131</u> | SP <u>147</u> | SP <u>163</u> | SP <u>179</u> | SP <u>195</u> | SP <u>211</u> | SP <u>227</u> | SP <u>243</u> |
| 4 | 0100 | SP <u>132</u> | SP <u>148</u> | SP <u>164</u> | SP <u>180</u> | SP <u>196</u> | SP <u>212</u> | SP <u>228</u> | SP <u>244</u> |
| 5 | 0101 | SP <u>133</u> | SP <u>149</u> | SP <u>165</u> | SP <u>181</u> | SP <u>197</u> | SP <u>213</u> | SP <u>229</u> | SP <u>245</u> |
| 6 | 0110 | SP <u>134</u> | SP <u>150</u> | SP <u>166</u> | SP <u>182</u> | SP <u>198</u> | SP <u>214</u> | SP <u>230</u> | SP <u>246</u> |
| 7 | 0111 | SP <u>135</u> | SP <u>151</u> | SP <u>167</u> | SP <u>183</u> | SP <u>199</u> | SP <u>215</u> | SP <u>231</u> | SP <u>247</u> |
| 8 | 1000 | SP <u>136</u> | SP <u>152</u> | SP <u>168</u> | SP <u>184</u> | SP <u>200</u> | SP <u>216</u> | SP <u>232</u> | SP <u>248</u> |
| 9 | 1001 | SP <u>137</u> | SP <u>153</u> | SP <u>169</u> | SP <u>185</u> | SP <u>201</u> | SP <u>217</u> | SP <u>233</u> | SP <u>249</u> |
| A | 1010 | SP <u>138</u> | SP <u>154</u> | SP <u>170</u> | SP <u>186</u> | SP <u>202</u> | SP <u>218</u> | SP <u>234</u> | SP <u>250</u> |
| B | 1011 | SP <u>139</u> | SP <u>155</u> | SP <u>171</u> | SP <u>187</u> | SP <u>203</u> | SP <u>219</u> | SP <u>235</u> | SP <u>251</u> |
| C | 1100 | SP <u>140</u> | SP <u>156</u> | SP <u>172</u> | SP <u>188</u> | SP <u>204</u> | SP <u>220</u> | SP <u>236</u> | SP <u>252</u> |
| D | 1101 | SP <u>141</u> | SP <u>157</u> | SP <u>173</u> | SP <u>189</u> | SP <u>205</u> | SP <u>221</u> | SP <u>237</u> | SP <u>253</u> |
| E | 1110 | SP <u>142</u> | SP <u>158</u> | SP <u>174</u> | SP <u>190</u> | SP <u>206</u> | SP <u>222</u> | SP <u>238</u> | SP <u>254</u> |
| F | 1111 | SP <u>143</u> | SP <u>159</u> | SP <u>175</u> | SP <u>191</u> | SP <u>207</u> | SP <u>223</u> | SP <u>239</u> | SP <u>255</u> |

| Country | ASCII code (Hex) | | | | | | | | | | | |
|---------------|------------------|----|----|----|----|----|----|----|----|----|----|----|
| | 23 | 24 | 40 | 5B | 5C | 5D | 5E | 60 | 7B | 7C | 7D | 7E |
| USA | # | \$ | @ | [| \ |] | ^ | ` | { | | } | ~ |
| France | # | \$ | à | ° | ç | § | ^ | ` | é | ù | è | ¨ |
| Germany | # | \$ | § | Ä | Ö | Ü | ^ | ` | ä | ö | ü | ß |
| U.K. | £ | \$ | @ | [| \ |] | ^ | ` | { | | } | ~ |
| Denmark I | # | \$ | @ | Æ | Ø | Å | ^ | ` | æ | ø | å | ~ |
| Sweden | # | ¤ | É | Ä | Ö | Å | Ü | é | ä | ö | å | ü |
| Italy | # | \$ | @ | ° | \ | é | ^ | ù | ä | ò | è | í |
| Spain I | Pt | \$ | @ | ı | Ñ | ı | ^ | ` | ¨ | ñ | } | ~ |
| Japan | # | \$ | @ | [| ¥ |] | ^ | ` | { | | } | ~ |
| Norway | # | ¤ | É | Æ | Ø | Å | Ü | é | æ | ø | å | ü |
| Denmak II | # | \$ | É | Æ | Ø | Å | Ü | é | æ | ø | å | ü |
| Spain II | # | \$ | à | ı | Ñ | ı | é | ` | ı | ñ | ó | ú |
| Latin America | # | \$ | à | ı | Ñ | ı | é | ü | ı | ñ | ó | ú |
| Korea | # | \$ | @ | [| ₩ |] | ^ | ` | { | | } | ~ |

International Character Set

Chapter 5. Control Commands

5-1. EPSON mode commands

| Command | Hexadecimal | Function |
|---------------------|----------------------------------|--|
| <HT> | 09 | Horizontal tab |
| <LF> | 0A | Print and line feed |
| <FF> | 0C | Print and return to standard mode (In page mode) |
| <CR> | 0D | Print and carriage return |
| <CAN> | 18 | Cancel print data in page mode |
| <DLE> <EOT> n | 10 04 n | Real-time status transmission |
| <DLE> <ENQ> n | 10 05 n | Real-time request to printer |
| <DLE> <DC4> ... | 10 14 01 m t | Generate pulse in real-time |
| | 10 14 02 01 08 | Execute power-off sequence |
| | 10 14 08 01 03 14 01 06 02 08 | Clear buffer(s) |
| <ESC> <FF> | 1B 0C | Print data in page mode |
| <ESC> <SP> n | 1B 20 n | Set right-side character spacing |
| <ESC> ! n | 1B 21 n | Select print mode(s) |
| <ESC> \$ nL nH | 1B 24 nL nH | Set absolute print position |
| <ESC> % n | 1B 25 n | Select / cancel user-defined character set |
| <ESC> & y c1 c2 ... | 1B 26 y c1 c2 ... | Define user-defined characters |
| <ESC> * m nL nH ... | 1B 2A m nL nH ... | Select bit-image mode |
| <ESC> - n | 1B 2D n | Turn underline mode on/off |
| <ESC> 2 | 1B 32 | Select default line spacing |
| <ESC> 3 n | 1B 33 n | Set line spacing |
| <ESC> = n | 1B 3D n | Select peripheral device |
| <ESC> ? n | 1B 3F n | Cancel user-defined characters |
| <ESC> @ | 1B 40 | Initialize printer |
| <ESC> D n1...nk 00 | 1B 44 n1...nk 00 | Set horizontal tab positions |
| <ESC> E n | 1B 45 n | Turn emphasized mode on/off |
| <ESC> G n | 1B 47 n | Turn double-strike mode on/off |
| <ESC> J n | 1B 4A n | Print and feed paper |
| <ESC> L | 1B 4C | Select page mode |
| <ESC> M n | 1B 4D n | Select character font |
| <ESC> R n | 1B 52 n | Select an international character Set |
| <ESC> S | 1B 53 | Select standard mode |
| <ESC> T n | 1B 54 n | Select print direction in page mode |
| <ESC> V n | 1B 56 n | Turn 90°clockwise rotation mode on/off |
| <ESC> W xL ... | 1B 57 xL ... | Set printing area in page mode |
| <ESC> \ nL nH | 1B 5C nL nH | Set relative print position |
| <ESC> a n | 1B 61 n | Select justification |

| Command | Hexadecimal | Function |
|-----------------|---------------|--|
| <ESC> c 3 n | 1B 63 33 n | Select paper sensor(s) to output paper-end signals |
| <ESC> c 4 n | 1B 63 34 n | Select paper sensor(s) to stop printing |
| <ESC> c 5 n | 1B 63 35 n | Enable/disable panel buttons |
| <ESC> d n | 1B 64 n | Print and feed n lines |
| <ESC> p m t1 t2 | 1B 70 m t1 t2 | General pulse |
| <ESC> t n | 1B 74 n | Select character code table |
| <ESC> { n | 1B 7B n | Turn upside-down printing mode on/off |
| <FS> p n m | 1C 70 n m | Print NV bit image |
| <FS> q n ... | 1C 71 n ... | Define NV bit image |
| <GS> ! n | 1D 21 n | Select character size |
| <GS> \$ nL nH | 1D 24 nL nH | Set absolute vertical print position in page mode |
| <GS> (A ... | 1D 28 41 ... | Execute test print |
| <GS> (C ... | 1D 28 43 ... | Edit of user NV memory |
| <GS> (D ... | 1D 28 44 ... | Enable / disable real-time command |
| <GS> (E ... | 1D 28 45 ... | User setup commands |
| <GS> 8 L ... | 1D 38 4C ... | Set graphics data |
| <GS> (L ... | 1D 28 4C ... | |
| <GS> (M ... | 1D 28 4D ... | Customize printer control value(s) |
| <GS> (N ... | 1D 28 4E ... | Select character style(s) |
| <GS> (k ... | 1D 28 6B ... | Setup and print symbol |
| <GS> * x y ... | 1D 2A x y ... | Define downloaded bit image |
| <GS> / m | 1D 2F m | Print downloaded bit image |
| <GS> : | 1D 3A | Start/end macro definition |
| <GS> B n | 1D 42 n | Turn white/black reverse printing mode on/off |
| <GS> H n | 1D 48 n | Select printing position of HRI characters |
| <GS> I n | 1D 49 n | Transmit printer ID |
| <GS> L nL nH | 1D 4C nL nH | Set left margin |
| <GS> P x y | 1D 50 x y | Set horizontal and vertical motion units |
| <GS> V m | 1D 56 m | Select cut mode and cut paper |
| <GS> V m n | 1D 56 m n | |
| <GS> W nL nH | 1D 57 nL nH | Set printing area width |
| <GS> \ nL nH | 1D 5C nL nH | Set relative vertical print position in page mode |
| <GS> ^ r t m | 1D 5E r t m | Execute macro |

| Command | Hexadecimal | Function |
|------------------|--------------------|--|
| <GS> a n | 1D 61 n | Enable/disable Automatic Status Back (ASB) |
| <GS> f n | 1D 62 n | Select font for HRI characters |
| <GS> g 0... | 1D 67 30... | Initialize maintenance counter |
| <GS> g 2... | 1D 67 32... | Transmit maintenance counter |
| <GS> h n | 1D 68 n | Set bar code height |
| <GS> k mNUL | 1D 6B m... NUL | Print bar code |
| <GS> k m n ... | 1D 6B m n ... | |
| <GS> r n | 1D 72 n | Transmit status |
| <GS> v 0 m ... | 1D 76 30 m... | Print raster bit image |
| <GS> w n | 1D 77 n | Set bar code width |

5-2. STAR mode commands

| Command | Hexadecimal | Function |
|---------------------------------------|-----------------------------------|---|
| <ESC> R n | 1B 52 n | Select international character set |
| <ESC> <GS> t n | 1B 1D 74n | Select character table |
| <ESC> / 1 | 1B 2F 31 | Select slash zero |
| <ESC> / <1> | 1B 2F 01 | |
| <ESC> / 0 | 1B 2F 30 | Select normal zero |
| <ESC> / <0> | 1B 2F 00 | |
| <ESC> b n1 n2 n3 n4 d1 ... dk <RS> | 1B 62 n1 n2 n3 n4 d1 ... dk 1E | Select bar code printing |
| <ESC> M | 1B 4D | Select 12-dot pitch printing |
| <ESC> p | 1B 70 | Select 14-dot pitch printing |
| <ESC> P | 1B 50 | Select 15-dot pitch printing |
| <ESC> : | 1B 3A | Select 16-dot pitch printing |
| <ESC> <SP> n | 1B 20 n | Set character spacing |
| <SO> | 0E | Sets the printing magnified double in character width |
| <DC4> | 14 | Resets the printing magnified in character width |
| <ESC> W n | 1B 57 n | Sets the magnification rate in character width. |
| <ESC> <SO> | 1B 0E | Sets the printing magnified double in character height |
| <ESC> <DC4> | 1B 14 | Resets the printing magnified in character height |
| <ESC> h n | 1B 68 n | Sets the magnification rate in character height |
| <ESC> - 1 | 1B 2D 31 | Select underlining |
| <ESC> - <1> | 1B 2D 01 | |
| <ESC> _ 1 | 1B 5F 31 | Select overlining |
| <ESC> _ <1> | 1B 5F 01 | |
| <ESC> 4 | 1B 34 | Select highlight printing |
| <ESC> 5 | 1B 35 | Cancel highlight printing |
| <SI> | 0F | Inverted printing |
| <DC2> | 12 | Cancel inverted printing |
| <ESC> E | 1B 45 | Select emphasized printing |
| <ESC> F | 1B 46 | Cancel emphasized printing |
| <ESC> C n | 1B 43 n | Set page length in lines |
| <ESC> C <0> n | 1B 43 00 n | Set page length in inches |
| <ESC> N n | 1B 4E n | Set bottom margin |

| Command | Hexadecimal | Function |
|------------------------------------|--------------------------------|----------------------------------|
| <ESC> O | 1B 4F | Cancel bottom margin |
| <ESC> I n | 1B 6C n | Set left margin |
| <ESC> Q n | 1B 51 n | Set right margin |
| <LF> | 0A | Line feed |
| <ESC> a n | 1B 61 n | Feed paper n lines |
| <FF> | 0C | Form feed |
| <HT> | 09 | Horizontal tab |
| <VT> | 0B | Vertical tab |
| <ESC> z 1 | 1B 7A 31 | Set line spacing to 4 mm |
| <ESC> 0 | 1B 30 | Set line spacing to 3 mm |
| <ESC> J n | 1B 4A n | One time n/4 mm feed |
| <ESC> I n | 1B 49 n | One time n/8 mm feed |
| <ESC> B n1 n2...<0> | 1B 42 n1 n2 ... 00 | Set vertical tab stops |
| <ESC> D n1 n2...<0> | 1B 44 n1 n2 ... 00 | Set horizontal tab stops |
| <ESC> <GS> A n1 n2 | 1B 1D 41 n1 n2 | Absolute position setting |
| <ESC> <GS> R n1 n2 | 1B 1D 52 n1 n2 | Relative position setting |
| <ESC> <GS> a n | 1B 1D 61 n | Alignment |
| <ESC> K n1 n2 d1 ... dk | 1B 4B n1 n2 d1 ... dk | Print normal density graphics |
| <ESC> L n1 n2 d1 ... dk | 1B 4C n1 n2 d1 ... dk | Print high density graphics |
| <ESC> k n1 n2 d1 ... dk | 1B 6B n1 n2 d1 ... dk | Print fine density graphics |
| <ESC> X n1 n2 d1 ... dk | 1B 58 n1 n2 d1 ... dk | Print fine density graphics |
| <ESC> <FS> p n m | 1B 1C 70 n m | Print NV bit image |
| <ESC> <FS> q n d1...dk | 1B 1C 71 n d1...dk | Define NV bit image |
| <ESC> & 1 1 n m1 m2 ... m48 | 1B 26 31 31 n m1 m2 ... m48 | Define download character |
| <ESC> & <1> <1> n m1 m2 ... m48 | 1B 26 01 01 n m1 m2 ... m48 | |
| <ESC> & 1 0 n | 1B 26 31 30 n | Delete a download character |
| <ESC> & <1> <0> n | 1B 26 01 00 n | |
| <ESC> % 1 | 1B 25 31 | Enable download character set |
| <ESC> % <1> | 1B 25 01 | |
| <ESC> % 0 | 1B 25 30 | Disable download character set |
| <ESC> % <0> | 1B 25 00 | |
| <ESC> <GS> * x y ... | 1B 1D 2A x y ... | Definition of download bit image |

| Command | Hexadecimal | Function |
|-----------------------|-------------|---|
| <ESC> <GS> / m | 1B 1D 2F m | Printing of download bit image |
| <ESC> <BEL> n1 n2 | 1B 07 n1 n2 | Define drive pulse width for peripheral device #1 |
| <BEL> | 07 | Control peripheral device #1 |
| <FS> | 1C | Control peripheral device #1 immediately |
| | 19 | Control peripheral device #2 |
| <SUB> | 1A | Control peripheral device #2 immediately |
| <ESC> d n | 1B 64 n | Partial Cut |
| <CAN> | 18 | Cancel last line & Initialize printer immediately |
| <DC3> | 13 | Deselect printer |
| <DC1> | 11 | Set select mode |
| <RS> | 1E | Beep the buzzer |
| <ESC> @ | 1B 40 | Initialize printer |
| <ENQ> | 05 | Inquiry(Status inquiry) |
| <EOT> | 04 | Near end status inquiry |
| <ESC> ? <LF> <NUL> | 1B 3F 0A 00 | Reset printer hardware (Perform test print) |
| <ESC> 8 n1 n2 | 1B 38 n1 n2 | Registers a logo pattern |
| <ESC> 9 n1 n2 | 1B 39 n1 n2 | Prints a logo pattern |

APPENDIX

A. Miscellaneous Notes

A.1 Notes on Printing and Paper Feeding

1) Because the TP-3020 printer is a line printer, it automatically feeds paper after printing the data.

Therefore, when the line spacing for one line is set to a smaller value than the print data, paper may be fed more than the set amount just to print the data.

For example, when the line spacing for one line is set to 10 dots (10/180 inches) and only paper feeding is executed, paper is fed for 10 dots; however, if bit-image characters are printed, paper is fed for 24 dots. (Refer to Table A.1)

When only rotated characters are printed on one line, paper feeding is executed as shown in Table A.1

Table A.1 Paper Feeding Amount

| | | Required Paper Feeding Amount(dots) |
|----------------------------|--------|--|
| Normal Characters | Font A | 24 x number of times enlarged in vertical |
| | Font B | 17 x number of times enlarged in vertical |
| Rotated Characters | Font A | 12 x number of times enlarged in vertical |
| | Font B | 9 x number of times enlarged in vertical |
| Bit image (ESC *) | | 24 |

2) When the printer goes to the standby (data-waiting) state during printing, it temporarily stops printing and feeding paper. When data is transmitted and printing is executed, paper may shift 1 to 3 dots from the print starting position, which especially affects bit-image printing.

3) Interval of auto-cutting operation in the receipt section.

For driving the auto cutter of the receipt section, take the interval as a minimum of 10 lines of printing or paper feeding (to prevent small pieces of cut paper from dropping into the auto cutter).

A.2 Notes on Printer Installation

1) Connect the external power supply to the power supply connector of the printer. Then plug in the external power supply and turn it on if necessary. Be sure not to connect the external power supply with the wrong polarity. If it is connected incorrectly, the internal circuit fuse of the printer may be blown or the external power supply may be damaged.

2) The power supply voltage is within the range of $24\text{ V} \pm 7\%$. If the power supply voltage drops to the outside of the range above during printing, the printer stops printing and waits until the voltage returns to normal and then automatically begins printing again. Therefore, printing speed may slow down, the printer pitch may not be correct, and some dots in some character may not be printed.

3) When either a high or low voltage error occurs, turn off the power as soon as possible.

A.3 Other notes

1) Printer mechanism handling

- ① Do not pull the paper out when the cover is closed.
- ② Because the thermal elements of the printer head and driver IC are easy to break, do not touch them with any metal objects.
- ③ Since the areas around the printer head become very hot during and just after printing, do not touch them.
- ④ Do not use the cover open button except when necessary.
- ⑤ Do not touch the surface of the printer head because dust and dirt can stick to the surface and damage the elements.
- ⑥ Thermal paper containing Na⁺, K⁺, and Cl⁻ ions can harm the printer head thermal elements.
Therefore, be sure to use only the specified paper.
- ⑦ Label paper cannot be used.

2) Thermal paper handling

- ① Notes on using thermal paper
Chemicals and oil on thermal paper may cause discoloration and faded printing.
Therefore, pay attention to the following:
 - a) Use water paste, starch paste, polyvinyl paste, or CMC paste when gluing thermal paper.
 - b) Volatile organic solvents such as alcohol, ester, and ketone can cause discoloration.
 - c) Some adhesive tapes may cause discoloration or faded printing.
 - d) If thermal paper touches anything which includes phthalic acid ester plasticizer for a long time, it can reduce the image formation ability of the paper and can cause the printed image to fade. Therefore, when storing thermal paper in a card case or sample notebook, be sure to use only products made from polyethylene, polypropylene, or polyester.
 - e) If thermal paper touches diazo copy paper immediately after copying, the printed surface may be discolored.
 - f) Thermal paper must not be stored with the printed surfaces against each other because the printing may be transferred between the surfaces.
 - g) If the surface of thermal paper is scratched with a hard metal object such as a nail, the paper may become discolored.
- ② Notes on thermal paper storage
Since color development begins at 70°C (158°F), Thermal paper should be protected from high temperature, humidity, and light, both before and after printing.
 - a) Store paper away from high temperature and humidity.
Do not store thermal paper near a heater or in enclosed places exposed to direct sunlight.
 - b) Avoid direct light.
Extended exposure to direct light may cause discoloration or faded printing.

3) Others

- Because this printer uses plated steel, the cutting edges may be subject to rust. However, this does not affect the printer performance.

B. Two-color printing

Two-color printing is performed using two-color thermal paper if the two-color print command is executed and if two-color paper is selected by the customized value setting with Function 5 of the **GS (E** command.

| <i>fn</i> | Format | Function |
|-----------|--|---|
| 1 | GS (E <i>pL pH fn d1 d2</i> | Changes into the user setting mode |
| 2 | GS (E <i>pL pH fn d1 d2 d3</i> | Ends the user setting mode session. (Performs a soft reset.) |
| 3 | GS (E <i>pL pH fn [a1 b18...b11]... [ak bk8...bk1]</i> | Sets value(s) for the memory switch. |
| 4 | GS (E <i>pL pH fn a</i> | Transmits the settings of the memory switch to the host. |
| 5 | GS (E <i>pL pH fn [a1 n1L n1H]... [ak nkL nkH]</i> | Sets the customized value(s). |
| 6 | GS (E <i>pL pH fn a</i> | Transmits the customized value settings. |
| 7 | GS (E <i>pL pH fn a d1 d2</i> | Copies the user-defined page. |
| 8 | GS (E <i>pL pH fn y c1 c2 [x d1... d(y Xx)]k</i> | Defines data in column format for the character code page in the active area. |
| 9 | GS (E <i>pL pH fn x c1 c2 [y d1... d(y Xx)]k</i> | Defines data in raster format for the character code page in the active area. |
| 10 | GS (E <i>pL pH fn c1 c2</i> | Deletes the data in the character code page in the active area. |
| 11 | - | - |
| 12 | GS (E <i>pL pH fn a</i> | Transmits the communication conditions for the serial interface. |

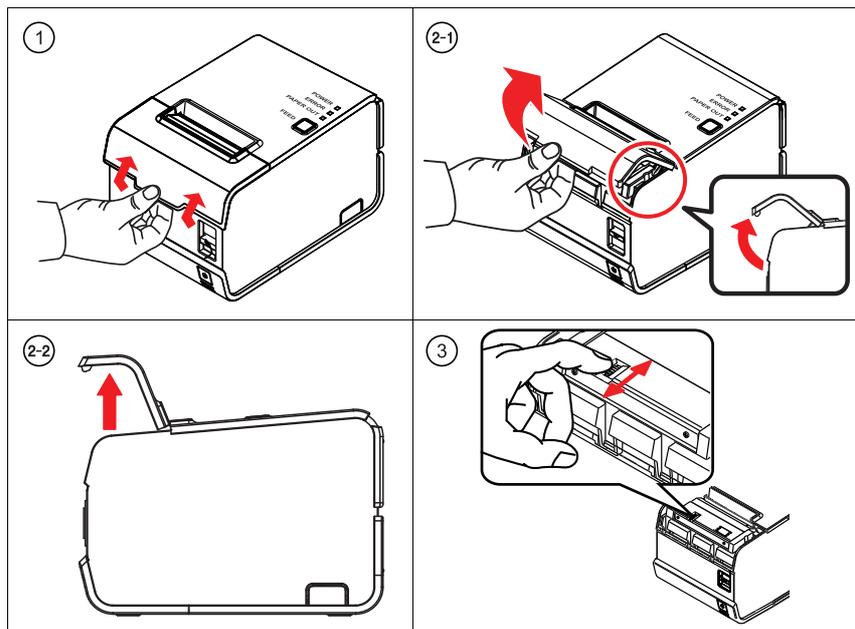
• *pL, pH* specify (*pL + pH × 256*) as the number of bytes after *pH* (*fn* and [*parameter*]).

- The user setting mode is a special mode to change the values in the NV user memory with this command.
- In Function 2, the printer performs software reset. Therefore, the printer clears the receive and print buffers, and resets all settings (user-defined characters, macros, and the character style) to the mode in effect at power on.

C. Recovery from the Auto Cutter Error

If a foreign object, for example a paper clip drops in the auto cutter and causes the auto cutter to lock up, the printer will error. The main Error LED will blink and the buzzer will beep regularly indicating there is a problem. In this instance the following procedure can be used to release the printer error.

- 1) Turn the power off using the POWER button
- 2) If it is possible open the printer cover, remove the roll and jammed paper and load a new paper roll.
 - ① If it is not possible to open the printer cover, turn the power on using the POWER button
 - ② Grip in front of the cutter's cover like as picture ① and remove it like as pictures, ②-1 and ②-2.
 - ③ Turn the 'auto cutter release knob' to a clockwise or to a counterclockwise direction like as a below picture ③, until buzzer stops.
(If you feel difficult to turn the 'auto cutter release knob' to one direction, you will try to turn it to the other direction; whatever directions you can turn it easily, a clockwise or a counterclockwise.)
 - ④ Open the printer cover, remove the roll and jammed paper and load a new paper roll.
 - ⑤ Power off and on the printer, or send the DLE ENQ n command to reset the printer.



D. Printer Head Cleaning

Paper dust on the heating elements may lower the printing quality. In this case, clean the printer head as follows:

- 1) Open the printer cover.
- 2) Clean the thermal elements of the printer head using a cotton swab moistened with alcohol solvent (ethanol, methanol, IPA).

NOTES : Do not touch the print head thermal elements.
Do not scratch the printer head.

- 3) Insert a paper roll and close the printer head.

NOTES : The print head becomes very hot just after printing and is very dangerous. Be sure to allow the print head to cool down (after printing) before cleaning it. Also, be sure to turn off the printer power before cleaning the print head.

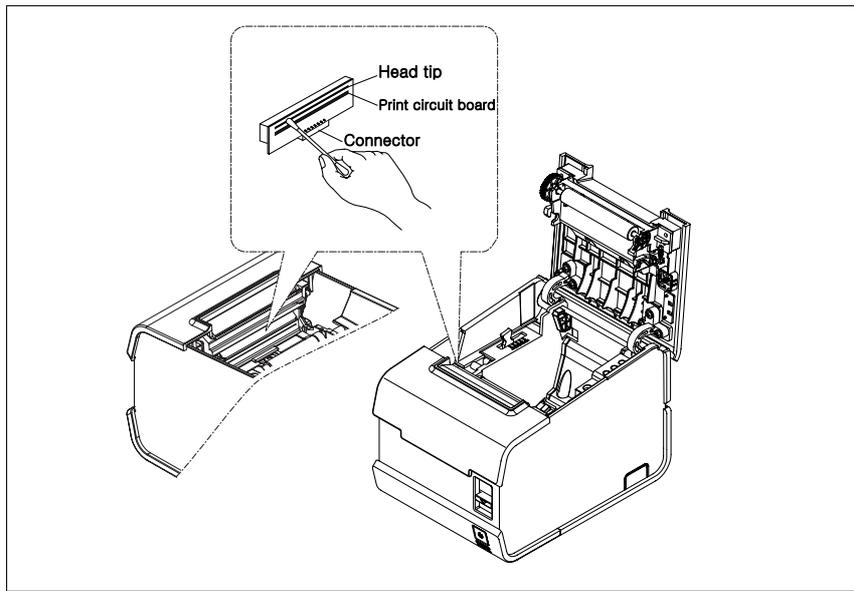
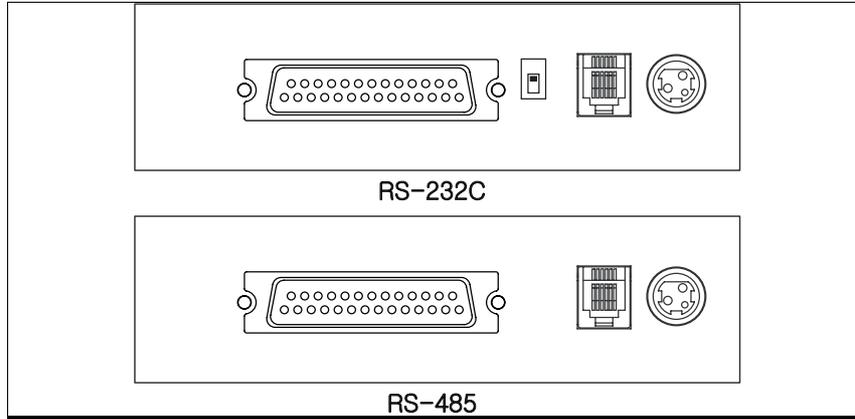


Figure C.1 Print Head Thermal Elements

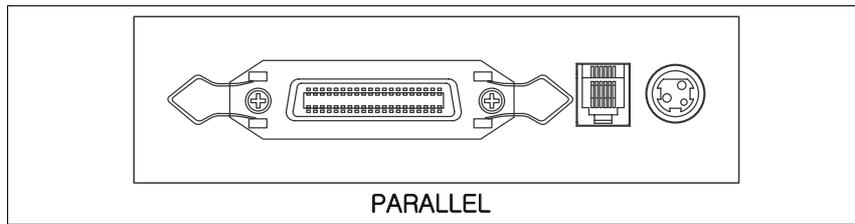
- (*) Depending on the paper roll used, paper dust may stick to the platen roller and paper roll end sensor. To remove the paper dust, clean the platen roller and paper roll end sensor with a cotton swab moistened with water.

E. Connectors

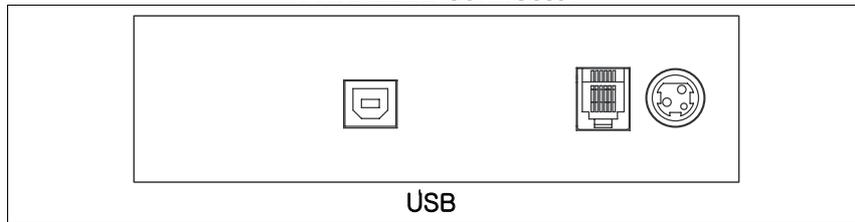


SERIAL Connector

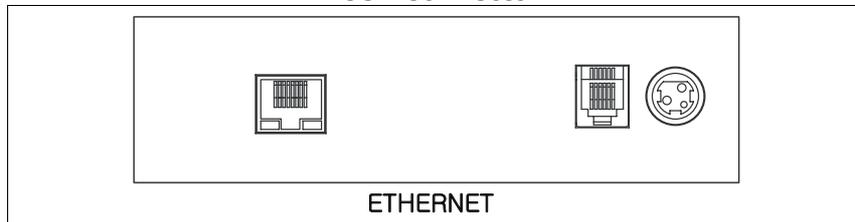
*Only when TP-3020 SERIAL is connected to a PANASONIC POS terminal with RS-232c, the DIP switch should be positioned to "OFF"(Lower direction)



PARALLEL Connector



USB Connector

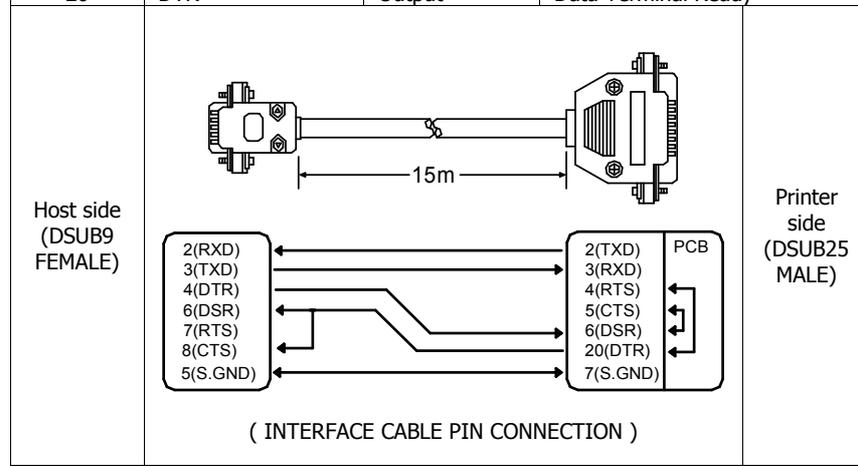


ETHERNET Connector

E.1 Interface Connector

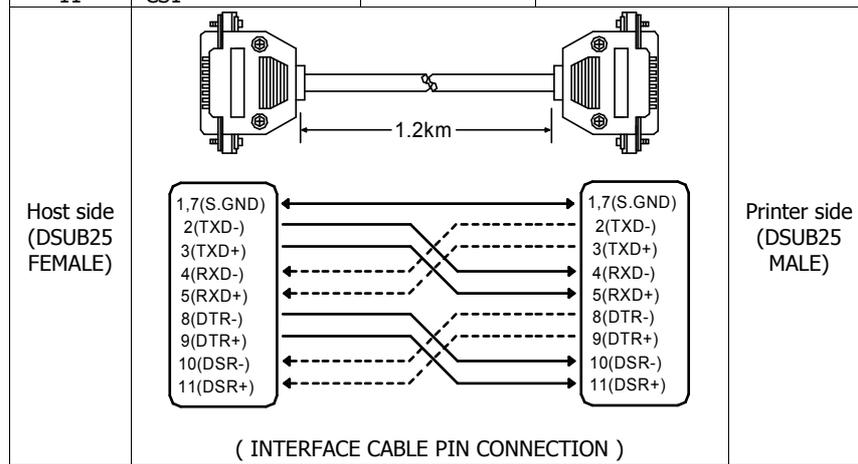
■ Serial Interface (RS-232)

| Pin No. | Signal name | Direction | Function |
|---------|-------------|-----------|---------------------|
| 1 | FG | - | Frame Ground |
| 2 | TxD | Output | Transmit Data |
| 3 | RxD | Input | Receive Data |
| 4 | RTS | Output | Request To Send |
| 6 | DSR | Input | Data Set Ready |
| 7 | SG | - | Signal Ground |
| 20 | DTR | Output | Data Terminal Ready |



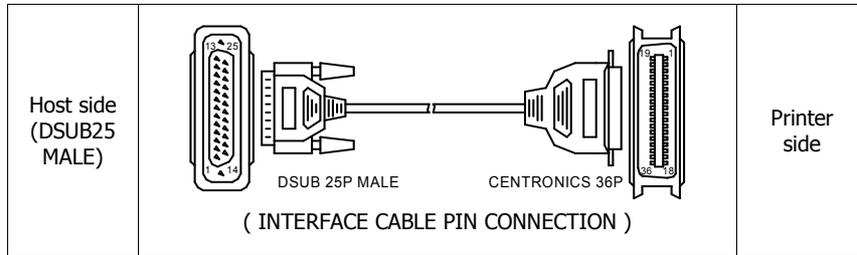
■ **Serial Interface (RS-485)**

| PinNo. | Signal name | Direction | Function |
|----------|-------------|-----------|---------------|
| 1 | FGND | - | Frame Ground |
| 2 | SD2 | Output | Transmit Data |
| 3 | SD1 | Output | |
| 4 | RD2 | Input | Receive Data |
| 5 | RD1 | Input | |
| 7 | SGND | - | Signal Ground |
| 8 9 | DR2 DR1 | Output | DSR(RS-232) |
| 10 11 | CS2 CS1 | Input | DTR(RS-232) |



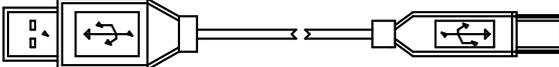
■ **Parallel Interface (IEEE 1284)**

| Pin | Source | Compatibility Mode | Nibble Mode | Byte Mode |
|------------|----------------|---------------------------|------------------------|------------------|
| 1 | Host | nStrobe | HostClk | HostClk |
| 2 | Host / Printer | Data 0 (LSB) | - | Data 0(LSB) |
| 3 | Host / Printer | Data 1 | - | Data 1 |
| 4 | Host / Printer | Data 2 | - | Data 2 |
| 5 | Host / Printer | Data 3 | - | Data 3 |
| 6 | Host / Printer | Data 4 | - | Data 4 |
| 7 | Host / Printer | Data 5 | - | Data 5 |
| 8 | Host / Printer | Data 6 | - | Data 6 |
| 9 | Host / Printer | Data 7 (MSB) | - | Data 7(MSB) |
| 10 | Printer | nAck | PtrClk | PtrClk |
| 11 | Printer | Busy | PtrBusy /Data3,7 | PtrBusy |
| 12 | Printer | Perror | AckDataReq /Data2,6 | AckDataReq |
| 13 | Printer | Select | Xflag /Data1,5 | Xflag |
| 14 | Host | nAutoFd | HostBusy | HostBusy |
| 15 | - | NC | NC | NC |
| 16 | - | GND | GND | GND |
| 17 | - | FG | FG | FG |
| 18 | Printer | Logic-H | Logic-H | Logic-H |
| 19~30 | - | GND | GND | GND |
| 31 | Host | nInit | nInit | nInit |
| 32 | Printer | nFault | nDataAvail /Data0,4 | nDataAvail |
| 33 | - | GND | ND | ND |
| 34 | Printer | DK_Status | ND | ND |
| 35 | Printer | +5V | ND | ND |
| 36 | Host | nSelectIn | 1284-Active | 1284-Active |



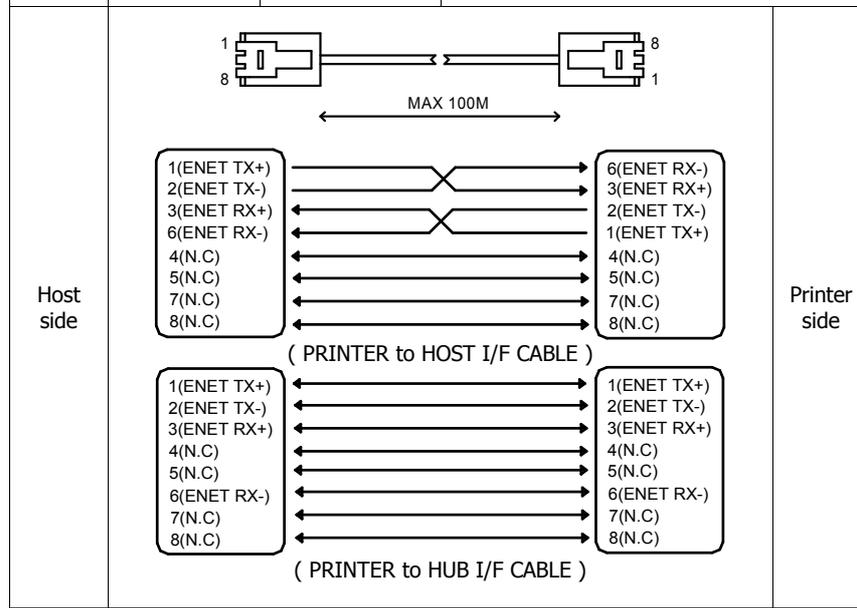
■ **USB Interface**

| Pin | Signal name | Line Color | Function |
|-------|-------------|------------|---------------|
| Shell | Shield | Drain Wire | Frame Ground |
| 1 | VBUS | Red | Host Power |
| 2 | D- | White | Data Line(D-) |
| 3 | D+ | Green | Data Line(D+) |
| 4 | GND | Black | Signal Ground |

| | | |
|-----------|---|-----------------|
| Host side |  <p>"A" TYPE PLUG "B" TYPE PLUG</p> <p>(USB INTERFACE CABLE)</p> | Printer side |
|-----------|---|-----------------|

■ **Ethernet Interface**

| Pin No | Signal Name | Signal Direction | Function |
|--------|-------------|------------------|--------------------------------|
| 1 | ENET TX+ | OUT | Ethernet Transmit Data Line(+) |
| 2 | ENET TX- | OUT | Ethernet Transmit Data Line(-) |
| 3 | ENET RX+ | IN | Ethernet Receive Data Line(+) |
| 4 | N.C | - | - |
| 5 | N.C | - | - |
| 6 | ENET RX- | IN | Ethernet Receive Data Line(+) |
| 7 | N.C | - | - |
| 8 | N.C | - | - |



NOTES : Even though pins 4,5,7, and 8 are not used, it is mandatory that they be present in the cable.

E.2 Drawer Connector

| Pin No. | Signal name | Direction |
|----------------|---------------------------------|------------------|
| 1 | Frame Ground | - |
| 2 | Drawer kick- out drive signal 1 | Output |
| 3 | Drawer open/close signal | Input |
| 4 | +24V | - |
| 5 | Drawer kick- out drive signal 2 | Output |
| 6 | Signal Ground | - |

F. Error Status

The printer beeps the buzzer or continuously the ERROR LED blinks when it enters the Error status.

There are four kinds of error status in TP-3020 as below:

■ Paper Out Error (Buzzer status)

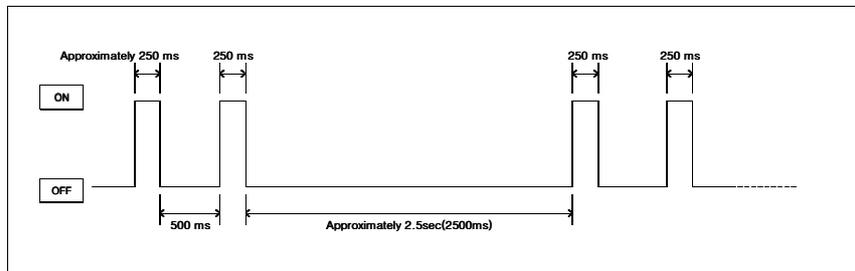
TP-3020 beeps the buzzer as like " Beep---,Beep---,..." and turns on the NO PAPER LED when detecting the paper out. Change the paper roll in the TP-3020 then clear the error status after some motor feeds.



■ Cutter Jam (Buzzer and ERROR LED status)

If buzzer and ERROR LED beeps or blinks as like "Beep Beep ---, Beep Beep--- ...", the printer is on Cutter Jam error status.

You can remove this error status by looking into **APPENDIX C**<Page 42>.

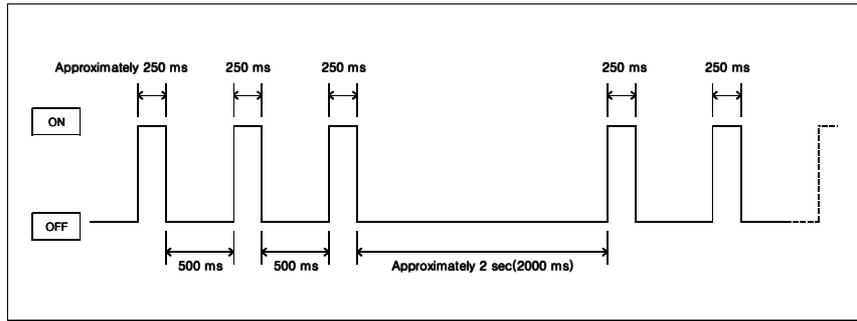


■ **Cutter Not Home (Buzzer and ERROR LED status)**

If the cutter blade is not in home position when the normal waiting time, the printer enters Cutter Not Home error status.

The buzzer and ERROR LED beeps and blinks as like:

(Beep beep beep----, Beep beep beep----, Beep beep beep...)

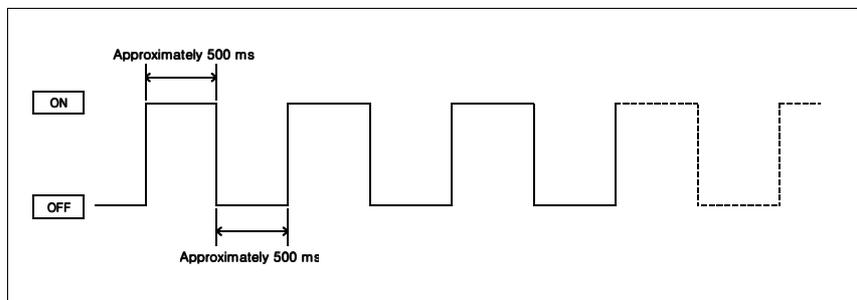


If you want to clear error status above, open the cutter cover and screw a motor worm gear with a screwdriver until the buzzer stops ringing.

■ **Interface board is not plugged in.**

(Buzzer ,ERROR LED and NO PAPER LED status)

If the ERROR LED and NO PAPER LED blink as below pattern without power LED on, the printer is in the no interface error status. If you do not have interface board, you must contact the dealers.

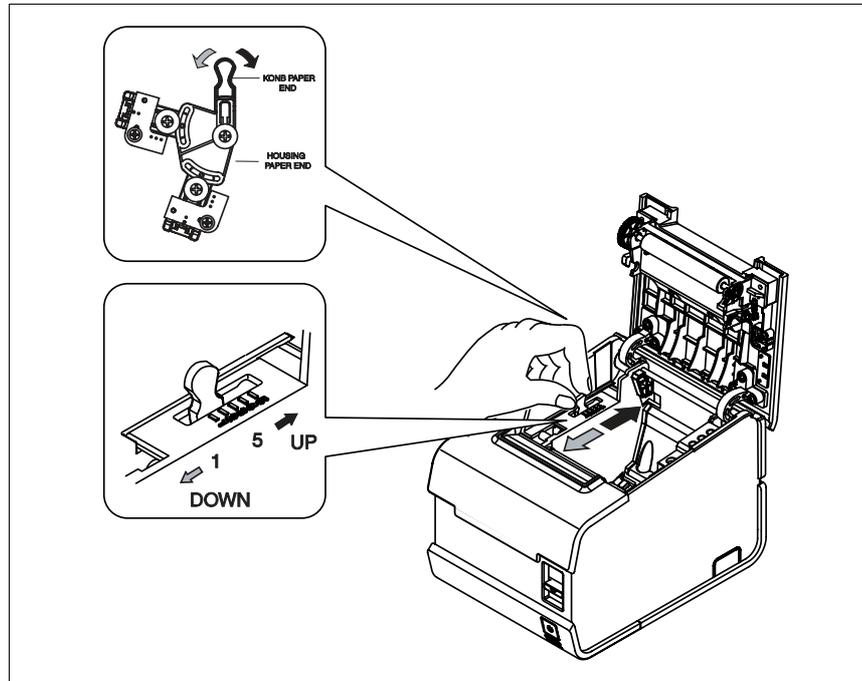


G. Adjusting the roll paper Near-End sensor location

This sensor has five settings, which are scale #1,2,3,4 and 5. The Near-End sensor is set to #3 positions at the factory. You can change the setting to adjustment scale #1,2,3,4 and 5 as described below.

1. Push the open button and open the cover open.
2. Change the setting to the scale #1,2,3,4 and 5.
3. If you find that there is too much paper remaining on the roll paper when the Near-End sensor is triggered. Push the knob Near-End sensor up to scale #4 or #5. Otherwise pull it down to scale #1 or #2 as illustrated figure.

The accuracy of the Near-End sensor depends on the adjustment scale setting and the winding core diameter of the roll paper. The Near-End sensor is set at adjustment #3. This is the appropriate scale for the recommended paper thickness.



H. Specification

H.1 General Printer specification

| | | | |
|---|----------------|--|---|
| Printing method | | Thermal line printing | |
| Dot density | | 180 dpi | |
| Printing width | | 72 mm | |
| Paper width | | 80 mm | |
| Characters per line (default) | | 42 (Font A) 56 (Font B) | |
| Printing speed | | 52 lines/sec 220 mm/sec | |
| Receive Buffer Size | | 4 Kbytes | |
| NOTE : Printing speed may be slower, depending on the data transmission speed and the combination of control commands. | | | |
| Supply voltage | Input voltage | 100 ~ 240V AC | |
| | Frequency | 50 ~ 60 Hz | |
| | Output voltage | +24V DC | |
| Environmental conditions | Temperature | 5 ~ 45°C (Operating) -10 ~ 50°C (Storage) | |
| | Humidity | 10 ~ 90 % RH ; except the paper roll. | |
| MCBF | Mechanical | Printer | 70,000,000 lines |
| | | TPH | 1x10 ⁸ pulse (Approximately 150 Km) |
| | | Cutter | 1,500,000 Cut |

H.2 Paper specification

| Item | Description | Remark |
|--------------------|--------------------------------|------------------|
| Paper Type | Mitsubishi F5841 | Black color |
| | Mitsubishi PB670* | Red/Black color |
| | Mitsubishi PB770* | Blue/Black color |
| Paper Form | Paper Roll | |
| Paper Width | 80 (+0,-1) , 3.14"(+0,-0.039") | |
| Paper Roll Size | Max 83mm | |
| Spool Inside Dia. | 12mm (0.47") | |
| Spool Outside Dia. | 18mm (0.71") | |

*The Following paper can be used instead of the specified paper above.

- TF50KS-E : Nippon Paper industries Co., Ltd.

*Mitsubishi PB670 / PB770 are two color mode papers.

Rev.01