GENERAL SPECIFICATION

TSP100IV SK

REV. NO. 1.20

◆ Refer to the online manual for detail the product setup or uses.

Trademarks

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Precautions regarding this document

- No part of this document may be reprinted without permission.
- The contents of this document are subject to change without notice for functional improvement.
- Although every effort has been made to ensure that the contents of this document are correct, please contact us if you notice any errors or omissions in the description.
- The precautions in this document are not exhaustive of all possible events.

  We will not be held responsible for any damage caused by the result of operating this product or negligence.

Safety information

This section contains safety information for preventing harm to users of this product, to third persons, and damage to property.

Carefully read before using this product and use the product properly.

We are not liable for any damage that occurs as a result of incorrect use other than those detailed in the safety information or in the manual for this product, or for any damage that occurs due to repairs/changes made by a third party who is not part of our company or specified by our company.

Warning

⚠ Warning

- Immediately turn the power off and pull the power plug out of the electrical outlet if it emits heat, smoke, abnormal smells or abnormal sounds.
  Then contact the seller.
  If use of the product is continued, fire or electric shock may occur.
- Do not dissemble, repair or modify the product.
  Otherwise, it may cause fire, electric shock or injury.
- When pulling out the power plug, always pull the plug and not the cable.
  Otherwise, the power cable may be damaged, and a short circuit, fire or electric shock may occur.
- Do not damage, modify, forcefully bend, pull, twist, put a heavy object on, or squeeze the power cable.
  Otherwise, the power cable may be damaged, and a short circuit, fire or electric shock may occur.
- Do not use a damaged power cable or power plug, or loose electrical outlet.
  Otherwise, it may cause a short circuit, fire or electric shock.
- Do not touch the power plug with wet hands.
  Otherwise, it may cause an electric shock.
- Do not touch the cutter blade. Otherwise, it may cause an injury.
  - There is a cutter inside the paper exit, so do not touch the blade even when it is not operating, as well as when it is operating.
  - The printer cover will be opened when replacing the paper roll, but as there is a cutter inside the printer cover, do not bring your face or hands close to the cutter blade when the printer cover is opened.
- If foreign matter such as liquid or metal fragments get inside this product, immediately cut off the power and pull the power plug out of the electrical outlet. Then contact the seller.
  If use of the product is continued, fire or electric shock may occur.

Installation notes

⚠ Warning

Do not install the product in the following locations.

Otherwise, an electric shock or fire may occur.

- Locations where there is a danger of electricity or water leakages
- Locations that are in the vicinity of fire, that are subject to direct sunlight, or where heat may be trapped

⚠ Caution

Do not install the product in the following locations.

Otherwise, it may cause malfunction.

- Locations where there is static electricity or where a strong magnetic field is generated
- Locations where ventilation is poor or dusty locations
- This product uses DC motors and switches which require contact with electricity; therefore avoid using in locations where silicone gas or flammable gas is volatilized.
- Locations where temperature and humidity exceed the usage environment conditions, or where condensation occurs
- Locations where the floor is not flat, or where vibrations occur, such as inside the car

  Problems such as paper feed errors may occur.
- Do not use the same electrical outlet as the one where equipment that generates noise such as copiers and refrigerators are connected to.
- Location at a distance from an electrical outlet

  Install in a location that is near the electrical outlet so that the power plug can be immediately pulled out if an abnormality occurs.

To install accessories and optional products

When installing accessories and optional products, turn the power of this product off, and pull the power plug out of the electrical outlet.

Carefully read the installation steps in the manual and install correctly.

Handling notes

⚠ Caution

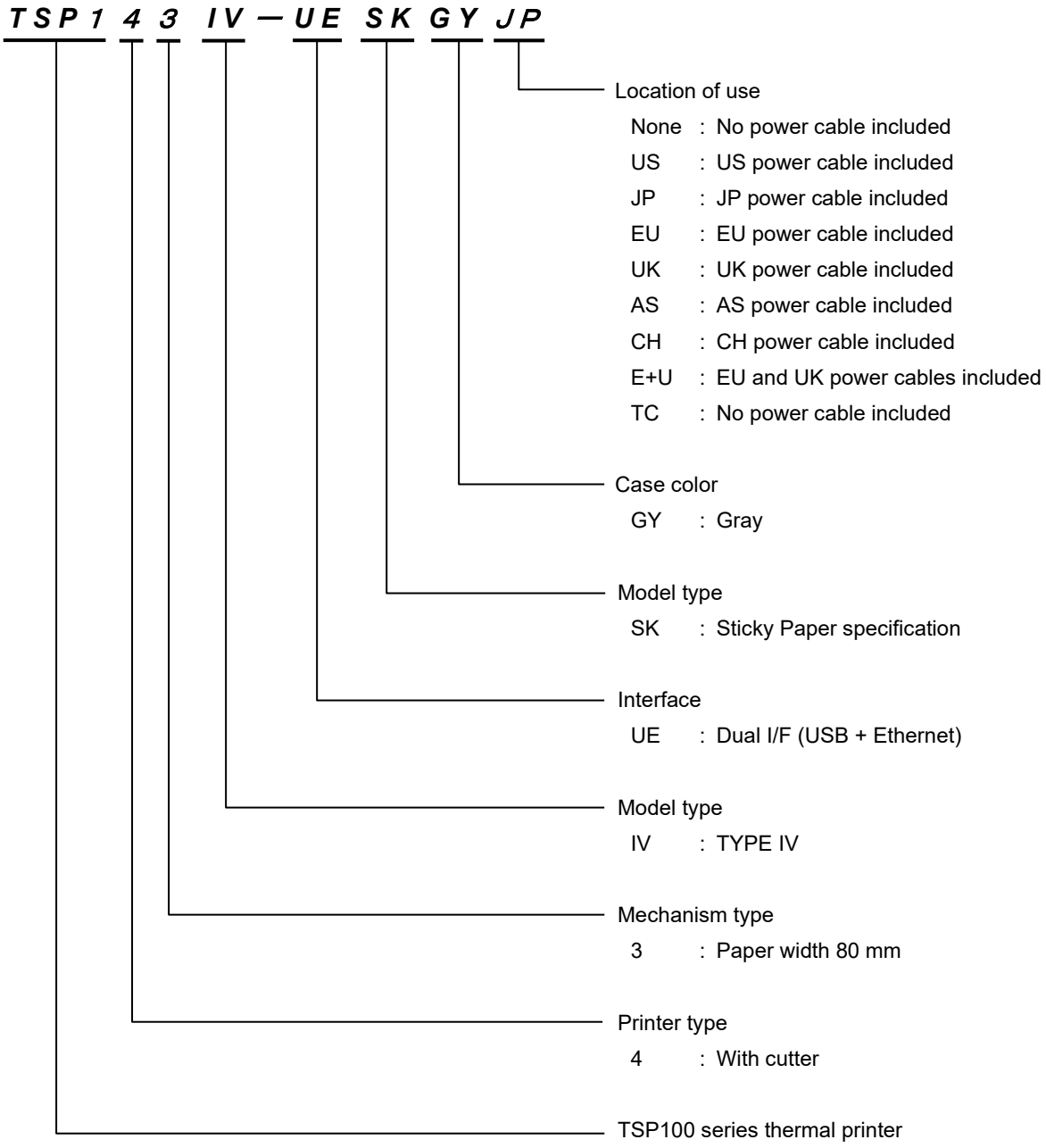
- If not being used for a long time, pull the power plug out of the electrical outlet to ensure safety.
- When connecting or removing a cable, remove the power plug for both this product and the PC from the electrical outlet to ensure safety.
- Be careful not to forcibly pull the connected USB cable, LAN cable, power cable, or cash drawer cable.
- When removing the cable, always hold the plug part, and make sure that no excessive force is applied to the connector on the printer side.
- Do not connect a telephone line to the external device drive connector. In addition, to ensure safety, avoid using wiring connections that may cause an excessive voltage to be applied to the external device drive connector. Otherwise, it may lead to malfunctions.
- Do not open the printer cover while the printer is printing or cutting.
- Do not pull out the paper while the printer cover is closed.
- Be careful not to get your hands trapped when opening or closing the cover. Otherwise, it may cause an injury.
- As the heating element in the thermal printer head and the driver IC part can be easily damaged, do not allow direct contact with metals, sandpaper and such.
- Remove the cut paper from the printer promptly.
- Do not operate the printer if there is moisture (which has been caused by condensation or another factor) on the front surface of the print head.
- If the thermal sheet has a large amount of [Na+, K+, Cl-] then the life of the thermal printer head may be drastically shortened. We recommend using products with ion concentration of Na+ 500 ppm, K+ 150 ppm, Cl- 300 ppm or less.
- Use in accordance with indicated environmental specifications. Even if the environmental temperature/humidity is within specifications, avoid drastic environmental condition changes. Refer to "2.3. Environmental specifications" for the environment suitable for using this product.
  However, when you want to charge your smartphone or tablet from the printer, use both the printer and device within the temperature range that satisfies the environmental specifications of the respective products.
- If you are using drivers provided by Star Micronics, limit the maximum number of LAN interface printers that are connected to a single host device to 10.
- When disposing of this product, be sure to follow local ordinances and regulations.

Table of Contents

1. Product Overview

The TSP100IV SK is a direct line thermal printer for linerless label with a clam-shell configuration.

1.1. Model Name



1.2. Product Configuration (Accessories and Optional Products)

[Accessories]

- Power cable 1.8 m
- USB Cable (A-C) 1.8 m
- LAN cable 1.0 m
- Paper Roll Guide (for paper width of 57.5 mm)
- Paper Roll Guide A/B (for paper width of 39 mm)
- Rubber feet (2 pcs)
- Safety Guide
- Setup Sheet
- Flyer

<Notes>
Accessories vary depending on the region where the printer was purchased.

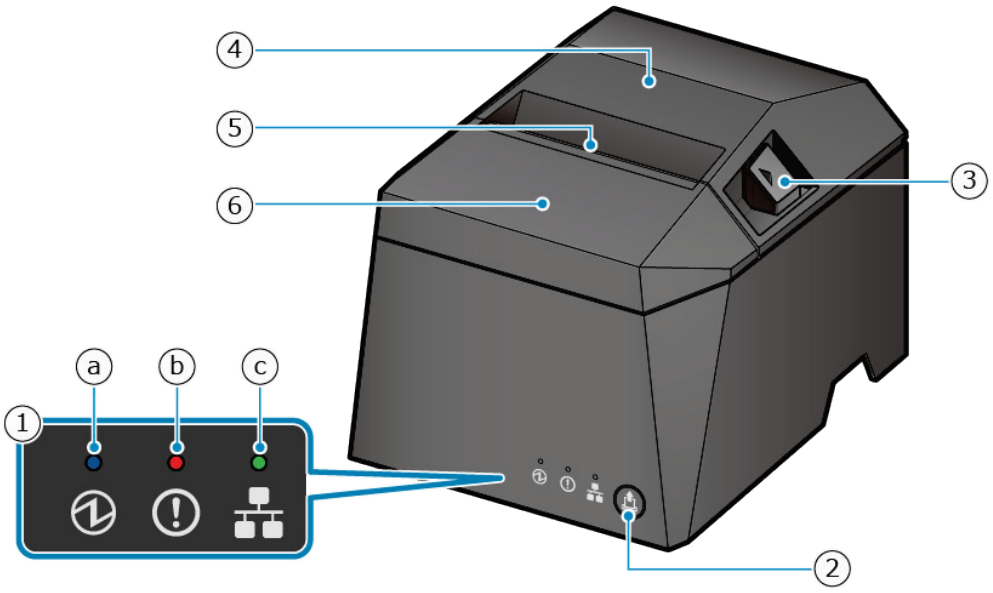
[Options]

● Barcode reader	Model	: BCR-POP1
	Connection	: USB-A port
	Applicable barcode	: 1D
● Customer display	Model	: SCD222U
	Connection	: USB-A port
● Wireless LAN unit	Model	: MCW10
	Connection	: LAN port, USB-A port
● Melody speaker	Model	: MCS10 (*1)
	Connection	: Connector to drive external device

*1) Supports the external device drive commands and melody speaker related commands.
For details, refer to Command Specifications from the link below.
https://www.star-m.jp/printersdks-wsw.html

1.3. Part Names and Functions

[Front of the printer]



① LED lamp

Indicates the printer status.

(a) Power LED (blue) : Lights up blue when the power is turned on.

(b) Error LED (red) : Lights up red when an error occurs.

(c) Network LED (green) : Lights up green according to the network connection status.

For details, refer to “4 Operating section and functions”.

② FEED button

Press this button to feed paper. Also, use this button to perform Self-Printing.

For details, refer to “4 Operating section and functions”.

③ Opening lever

Push this lever to open the printer cover when setting the paper roll.

④ Printer cover

Opens/Closes when setting the paper roll.

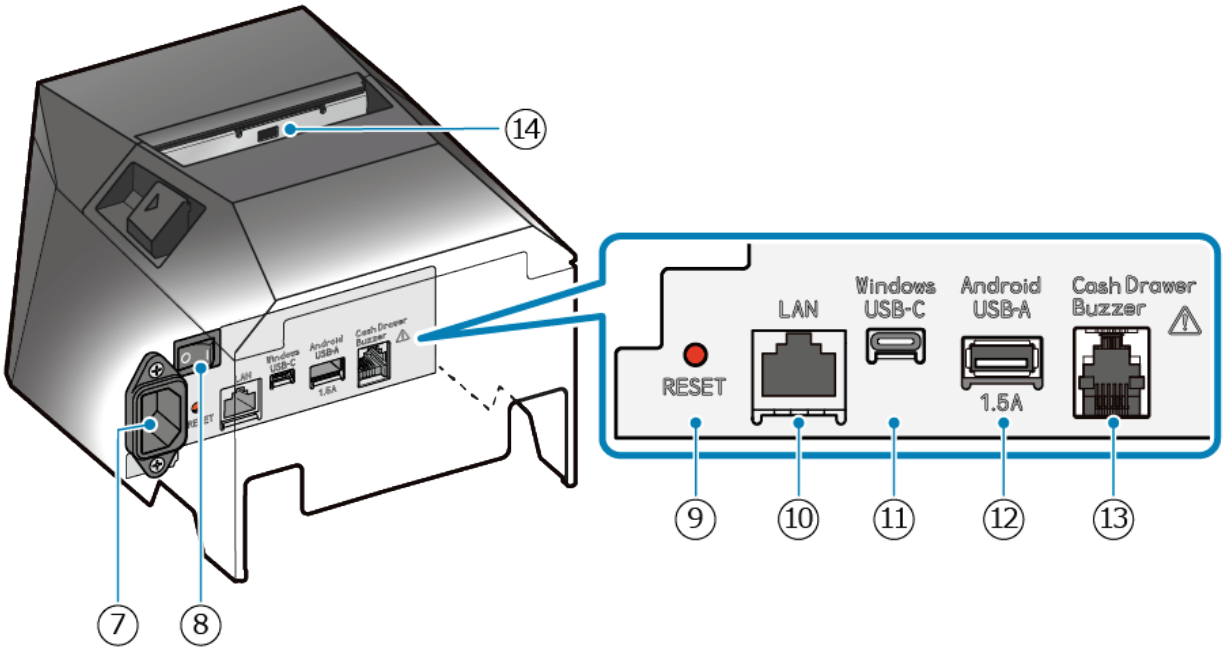
⑤ Paper exit

The printed paper is ejected from here.

⑥ Front cover

Remove the cover in order to clear a cutter error.

[Back of the printer]



⑦ Power socket

Connect the power cable that comes with the main unit.

⑧ Power switch

Turns the power on/off.

⑨ Reset switch

Initializes the main unit network settings.

⑩ LAN port

Connect the network with the LAN cable that comes with the main unit.

⑪ USB-C port

Connects a Windows device via the USB cable that comes with the main unit.

⑫ USB-A port

Connects an Android device via the USB cable that comes with the main unit.

Also connects to and communicates with USB-connectable products specified by Star Micronics (customer display: SCD222U, barcode reader: BCR-POP1).

In addition, it can provide power to tablet terminals and other USB devices.

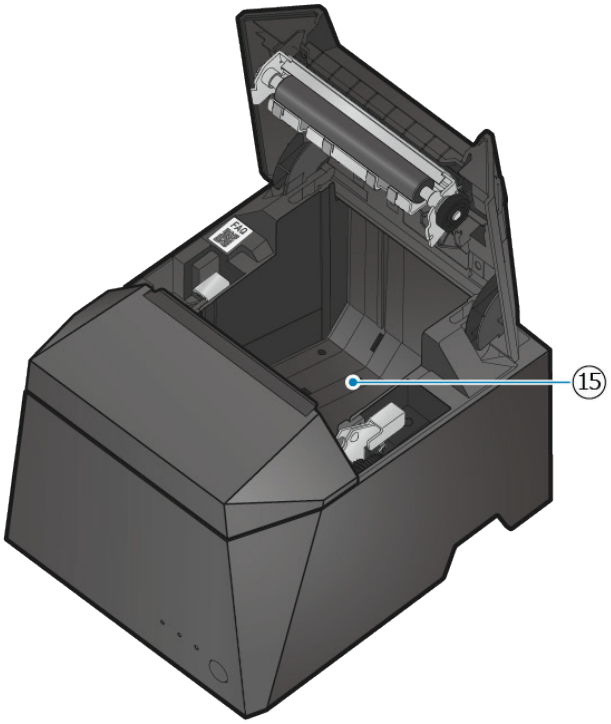
⑬ Connector to drive external device

Connects a melody speaker, buzzer, or cash drawer.

⑭ Hold print sensor

This sensor detects when the paper has been removed from the printer.

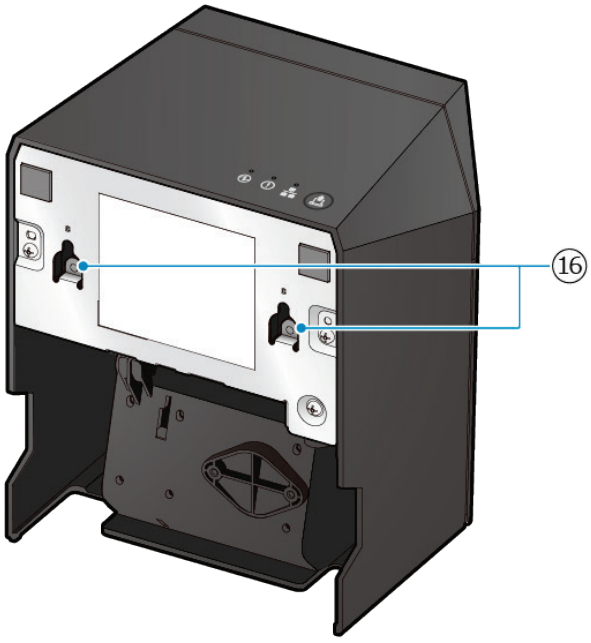
[Inside of the printer]



⑮ Paper roll holder

Sets the paper roll.

[Bottom of the printer]



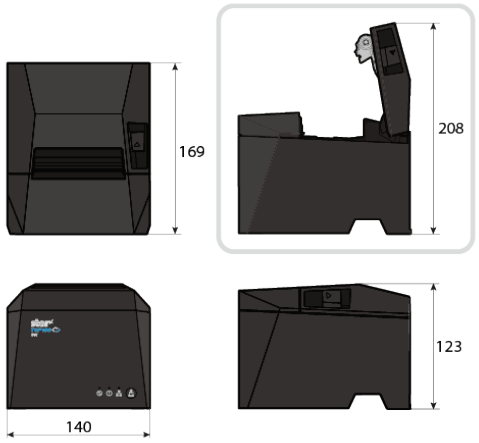
⑯ Wall-mounting holes

These are used when mounting the printer on the wall.

2. Product Specifications

2.1. General specifications

Item		Specification	
Printing specifications*1	Print method	Direct thermal printing (thermal method)	
	Dot configuration	576 dots/line	
	Print speed	Maximum 180 mm/sec (default)	
	Resolution	8 dots/mm (203 dpi)	
	Printing width	Paper width 79.5±0.5 mm	72 mm (Left margin: 3.75 mm, Right margin: 3.75 mm)
		Paper width 57.5±0.5 mm	51 mm (Left margin: 2.75 mm, Right margin: 3.75 mm) 50.8 mm (Left margin: 2.75 mm, Right margin: 3.95 mm) 48 mm (Left margin: 4.75 mm, Right margin: 4.75 mm)
		Paper width 39.0±0.5 mm	34.5 mm (Left margin: 2.05 mm, Right margin: 2.45 mm)
			32 mm (Left margin: 3.30 mm, Right margin: 3.70 mm)
	Roll diameter	Maximum 83 mm	
	Top margin	5 mm (default), 11 mm	
	Minimum printing length	24 mm	
	Paper feeding	Friction feeding method	
Barcode*2	1D	UPC-A, UPC-E, JAN/EAN8, JAN/EAN13, ITF, CODE39, CODE93, CODE128, CODABAR (NW-7) GS1-128, GS1 Omnidirectional, GS1 Truncated, GS1 Limited, GS1 Expanded	
	2D	PDF417, GS1 Stacked, GS1 Stacked Omnidirectional, GS1 Expanded Stacked, QR Code	
	Composite	GS1 Composite Symbols	
Font*3	Specification	European and US letter code	Code Page: Supported
		Kanji code	Japanese: Supported, Traditional Chinese (BIG5): Supported, Simplified Chinese (GB18030): Supported
		Unicode	UTF-8: Supported (specific font only)
	Type	ANK:Font-A	12 x 24 dots/1.50 x 3.00 mm IBM Block: 12 x 32 dot /1.50 x 4.00 mm
		ANK:Font-B	9 x 24 dots/1.125 x 3.00 mm IBM Block: 9 x 32 dot /1.125 x 4.00 mm
		Japanese Kanji characters: 96 alphanumeric characters	24 x 24 dots/3.00 x 3.00 mm
		Japanese Kanji characters: Extended graphics, 128 characters	
		Japanese Kanji characters: JIS level-1, 3489 characters	
		Japanese Kanji characters: JIS level-2, 3390 characters	
		Japanese Kanji characters: Special characters, 83 characters	
		Japanese Kanji characters: NEC selected IBM extended, 374 characters	
		Japanese Kanji characters: IBM extended, 388 alphanumeric characters	
		Japanese Kanji characters: Single-byte kanji characters, 282 characters	12 x 24 dots/1.50 x 3.00 mm
		Chinese characters (conform to GB18030.): 96 alphanumeric characters	24 x 24 dots/3.00 x 3.00 mm

Item		Specification	
Font*3	Type	Chinese characters (conform to GB18030.): 28574 kanji characters	24 x 24 dots/3.00 x 3.00 mm
		Traditional Chinese BIG5 (F): 96 alphanumeric characters	24 x 24 dots/3.00 x 3.00 mm
		Traditional Chinese BIG5 (F): Taiwan kanji, 13877 characters	
Emulation		StarPRNT	
Interface		USB-A x 1 Standard: USB2.0 Full-speed Embedded Host, USB BC1.2 CDP, AOA Power supply specifications: USB BC1.2 CDP (up to 7.5 W)	
		USB-C x 1 Standard: USB2.0 Full-speed Device	
		Ethernet x 1 10Base-T/100Base-TX (IEEE 802.3i/IEEE 802.3u)	
		DK-Port x 1 Connector to drive external device	
Sensor	Head temperature	Temporarily stops printing to lower the temperature of the thermal head when the thermal head becomes hot.	
	PCB temperature	Temporarily stops printing to lower the temperature of the PCB when the PCB becomes hot.	
	PE	Detects the end of the paper.	
	Hold print*4	Detects that the ejected paper has been removed. Can be enabled and disabled using the memory switches.	
	Cover open	Detects whether the printer cover is open or closed.	
	Cutter home position	Detects the home position of the cutter.	
Auto Cutter*5	Type	Guillotine type	
	Cutting method	Partial cut (leaving one uncut portion at center)	
	Cut duty	3 seconds/cut	
	Paper thickness	65 µm to 98 µm	
Printer orientation		Horizontal layout / Vertical layout (by using rubber feet supplied) / Wall-mounting (by using wall-mounting holes at the bottom of the main unit) *Tolerated angle range of printer orientation: ±5°	
External view	External dimensions	●When cover is closed 140 (W) x 169 (D) x 123 (H) mm ●When cover is open 140 (W) x 169 (D) x 208 (H) mm	 (Reference figure)
	Weight	Approx. 1.3 kg (not including paper roll)	

[Notes about the general specifications]

Note*1) Printing specifications

<Print speed>

Print mode	Paper width 79.5 mm/57.5 mm	Paper width 39.0 mm
High speed	Maximum 180 mm/sec	Maximum 100 mm/sec
Medium speed	Maximum 100 mm/sec	Maximum 100 mm/sec
Low speed	Maximum 63 mm/sec	Maximum 63 mm/sec

1) The above values apply when printing is performed with the power supply voltage at 24 V, the ambient temperature at 25°C, and the print density setting at default.
2) The print speed will automatically change according to the power supply voltage, ambient temperature of 25°C, printing density, printing patterns and other conditions.
3) The print speed may slow down depending on conditions such as the data transfer speed and print pattern.
4) When printing speed is high, printing may sometimes be intermittent. Reduce the print speed if you feel uneasy about intermittent printing.

<Printing width>

1) You can change the printing width setting with the memory switch.
2) When the printing width is set to be wider than the paper width, the life of the thermal head may become shorter than the specification.
3) When the paper width is not 79.5 mm, use the paper roll guide supplied.

<Print paper length>

When sending the printing data requiring the print paper length shorter than 24.0 mm, perform empty feed before cutting so that the print paper length becomes 24.0 mm or longer.

<Top margin>

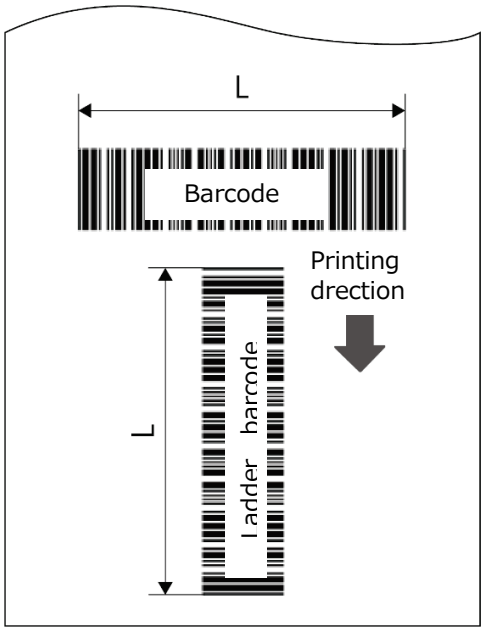
1) Even when the top margin is set to 5 mm (default setting), it will change to 11 mm forcibly when the ejected paper is not removed, and the next printing is executed with the paper retained.
2) When you leave the printer with power ON and the paper set, the top margin of the first sheet of the next printing may change because of the paper stick prevention function in the printer.

   If this function hinders your operation, unlock the printer cover and slightly open it when you do not use the printer for a certain period.
3) The top margin may change when using the printer at high temperature and humidity environments or using a narrow paper.

Note*2) Barcode

1) The barcode print quality largely depends on the color characteristics of the thermal paper, the environment (such as temperature and humidity) of the printer location, and the print density and print speed settings. When you read the printed barcodes using a scanner or other type of device, we strongly recommend that you evaluate the data scanning quality beforehand.
2) If you cannot obtain the desired scanning quality with your scanner, try to reduce the print speed, increase the size of the minimum module, or change the barcode length. These adjustments may improve the barcode scanning quality.
3) If you use GS1 Composite Symbols, it is strongly recommended that you adjust the size that can be read by the scanner and evaluate the data scanning quality beforehand. If you release the scanner to widen the scan area, the scanner reading may not be obtained in a satisfactory manner.

Barcode type		Barcode			Ladder barcode		
		Module size	Print speed	L	Module size	Print speed	L
1D		15 mil or more	No limit	Approx. 72 mm or less	20 mil or more	No limit	Approx. 72 mm or less
2D	PDF, GS1	15 mil or more	No limit	Approx. 72 mm or less	15 mil or more	No limit	Approx. 72 mm or less
	QR	15 mil or more	No limit	Approx. 72 mm or less	15 mil or more	No limit	Approx. 72 mm or less
Composite		15 mil or more	No limit	Approx. 72 mm or less	15 mil or more	No limit	Approx. 72 mm or less



Barcode : Barcode in which the direction of the bars is arranged parallel to the printing direction

Ladder barcode : Barcode in which the direction of the bars is arranged vertically to the printing direction

L : Barcode length

Note *3) Fonts

<Kanji>

1) Font settings can be changed from Utility or memory switch settings.

   For Japanese kanji characters, the JIS level-1 kanji characters and the JIS level-2 kanji characters are compliant with JIS x0208-1990/1997.

   JIS 2004 sample character style, level-1 and level-2 character sets and SHIFT-JIS code are supported.

2) Chinese kanji characters (GB18030 compliant) support 2-byte and 4-byte codes.

<UTF-8 support>

1) Entry of kanji and western characters by the UTF-8 code is supported.
2) Characters which can be printed with the UTF-8 code are western characters including the code page equipped in the printer and following kanji characters.
   - Japanese kanji characters
   - Chinese kanji characters conform to GB18030 2-bytes codes
   - Traditional Chinese BIG5
   - Hangul
3) For 4-byte code Chinese kanji conforming to GB18030, UTF-8 is not supported. "□" mark is printed for the unsupported code.
4) The conventional character code and the UTF-8 code can be switched by a command or the memory switch.

Note*4) Hold print sensor

1) When continuous printing is performed on the linerless label, a label may stick to the printer or mounting surface, resulting in a paper jam. To prevent this, the hold print function is provided.
2) When the hold print sensor is enabled and the paper has not been removed from the printer, printing will not start even when the next printing is selected. In this case, remove the paper. The next printing can be performed.

   For details, refer to "7.8 MSWA."
3) It is recommended to enable the hold print sensor (default setting) to prevent a paper jam in 1).

   When continuous printing is performed, disable this function and be sure to sufficiently verify the operation before use.
4) This can be used in combination with the print hold time setting or the optional buzzer unit melody speaker.

Note *5) Auto cutter

1) When an error occurs, open the printer cover, remove the error cause and then turn on the printer again to recover the printer.

   When the printer is not recovered correctly or the printer cover does not open, turn the power on again.
2) Take out the sheets after the cutting is completed properly.

   If it attempts to retrieve paper during the middle of a cutting, it may cause problems such as pieces of paper being cut or paper jams.

   <Note> The cutter may be damaged if the printer cover is opened during the middle of a cutting.

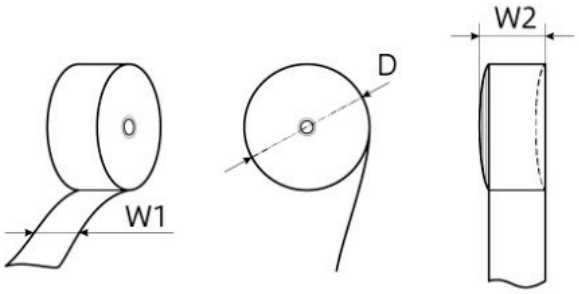
2.2. Paper specifications

Applicable paper type : Linerless sticky label paper

Notes 1) Do not change the paper width while the printer is in operation.
When the setting is changed from the narrow paper width to wide paper width, the product life may be shortened.
In addition, printing, paper feeding or cutting may not be performed correctly.

2) **After conducting thorough evaluation in the usage environment, change the print density as necessary.**
The print density can be changed with the print density setting command <ESC> <RS> 'd'n or "MSW2: Print density."
3) **Adequate reading results of barcodes or characters may not be attained because of factors such as the scanner, paper type, or print density. Be sure to evaluate your scanner with the printer in advance.**
4) **Pitch deviation may occur at the start of printing depending on printing contents and paper type.**
Change the top margin to 11 mm or perform empty feed before cutting.
5) **Stripe-like coloring or wrinkles may occur depending on paper type and operation environment.**
6) **Use the paper roll that is not fixed to the shaft core and of which label can be removed from the shaft core easily.**
In addition, do not use paper of which edge is folded.
When the paper edge is secured to the shaft core with glue or folded, replace the paper before it runs out.

2.2.1. Linerless sticky label paper

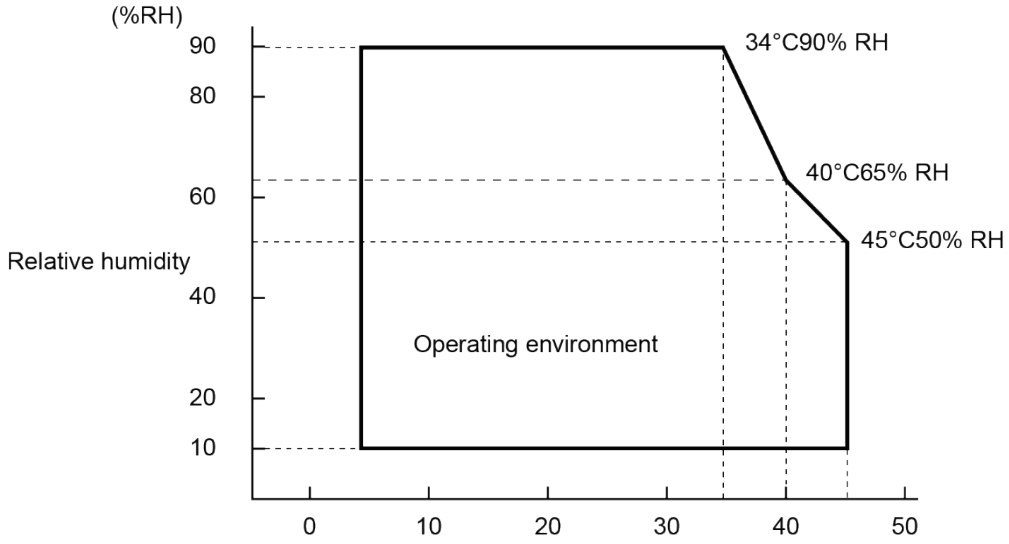


(1) Paper width [W1]	:	79.5 ±0.5 mm, 57.5 ±0.5 mm, 39.0±0.5 mm
(2) External dimensions	:	Winding diameter (maximum roll diameter) [D] …φ83 mm Roll Width (curling dimension) [W2] … Paper width [W1] +1, -0.5 mm
(3) Paper thickness	:	65 µm to 98 µm
(4) Shaft core outer diameter	:	Minimum φ25.4 mm
(5) Paper media	:	Use the paper that your local distributor handles. Contact the following local distributor for details of the paper that satisfies the specifications described in this document. https://www.star-m.jp/tsp100ivsk-sup.html?p=a4

2.3. Environmental specifications

2.3.1. Printer operating environment

Temperature : 5°C to 45°C
Humidity : 10%RH to 80%RH (No condensation)
(See below.)



Operating temperature and humidity range

Notes 1) Select the operation environment according to the paper specifications you use.

2) The property of the label paper changes, resulting in an error such as paper jam if you use the device in environment that does not conform to the specifications.

2.3.2. Printer storage environment

Temperature : -20 to 60°C
Humidity : 10%RH to 90%RH (No condensation)

<Note> The worst combination of high temperature and humidity is 40°C and 90%RH (no condensation).

2.4. Power specifications

The device has a built-in AC/DC power supply unit.

(1) Power input

- Voltage : 100 to 240 VAC +/-10%
- Current : 1.4 A
- Frequency : 50/60 Hz

(2) Power consumption

- During standby with power ON : Approx. 4 W (without external power supply)
  Approx. 13 W (when 1.5 A is supplied from USB-A)
- When printing ASCII : Approx. 39 W (without external power supply)
  Approx. 50 W (when 1.5 A is supplied from USB-A)

2.5. Reliability specifications

2.5.1. Life

(1) Life Mechanism : 11.25 million lines

<Note>
The cutter and thermal head are not included in the mechanism life.

(2) Thermal head life : 75 km (75 million pulses)

* Printing conditions: Average printing ratio 12.5%, Head average resistance value change rate +/-15% or less

<Notes>

1) **The life is calculated based on our own evaluation in normal temperature and humidity environments.**
2) **The end of the head's life is defined as the point when two or more adjacent dots are damaged.**
   However, this does not include scratches caused by external materials being affixed to the head or accidental damage caused by the user.
3) **When printing is repeatedly performed at an extremely high printing rate, the life may decrease drastically. Therefore, you must carefully plan the print formats that will be used.**

(3) Cutter life : 800,000 cuttings

<Notes>

1) **The life is calculated based on our own evaluation results in normal temperature and humidity environments.**
2) **The life is a representative value.**

2.5.2. MCBF

23.5 million lines

MCBF is defined as overall failures including accidental failures from part wear out leading to the life of the mechanical parts which is 10 million lines. (*Mechanical life is 10 million lines and the MCBF 22.5 million lines do not represent the durability life.)

2.5.3. MTBF

300,000 hours

MTBF is defined as a general interval of failures during the accidental failure period including circuit systems. (*MTBF is an index to represent the reliability and does not guarantee operation during 240,000 hours.)

2.5.4. Shocks from vibration and falling

(1) Vibration (when packaged)

- Direction of vibration : X, Y, and Z
- Vibration frequency : 7 Hz to 100 Hz
- Sweep time : Logarithmic frequency sweep rate, 15 minutes for reciprocation
- Vibration acceleration : 1.5 G, constant
- Application time : One hour (Total 3 hours)
- Packaging : Minimum packaging
- Criterion : No destruction of the device or removal of parts occur.
  Cracking and deformation of packaging and cushioning material shall be acceptable.

(2) Drop shock (when packaged)

- Drop height : 65 cm
- Direction of drop : 1 angle, 3 corners, 6 surfaces
- Number of drops : One each time (Total of 10 drops)
- Packaging : Minimum packaging
- Criterion : No destruction of the device or removal of parts occur.
  Cracking, detachments, and deformation of packaging and cushioning material shall be acceptable.

(3) Drop shock (when not packaged)

- Drop height : 5 cm
- Direction of drop : 4 sides, side instructions
- Number of drops : One for each direction
- Criterion : No destruction of the device or removal of parts occur.

2.5.5. Noise

- Measurement standard : JIS X 7779 (ISO 7779)
- During Operation : A-weighted sound pressure level: Approx. 57 dB

The above noise level is based on Star Micronics evaluation conditions that comply with JIS X7779.
The noise levels will vary depending on the paper that you use, the contents that you are printing, and the settings (print speed and print density) that you have made.

3. Communication specifications

3.1. Ethernet interface

(1) Communication specifications : 10Base-T/100Base-TX

(2) Connector : RJ-45 (8P8C)

Use the accessory cable or Category 5 or higher cables.

(3) Supported protocol : TCP/IP v4

TCP/IP specifications

Layer	Protocol	Reception port	Usage
Network layer	ARP, IP, ICMP		
	Link Local		Temporary IP address setting
Transport layer	TCP, UDP		
Application layer	DHCP		Dynamic IP address setting
	Raw Socket Print	9100/TCP	Printing/printer status acquisition
	Reset with authorization	22222/TCP	Force reset
	SDP (Star Discovery Protocol)	22222/UDP	Search for printers on network
	HTTP	80/TCP	Network settings Star CloudPRNT
	HTTPS	443/TCP	Star Micronics Cloud Service (*1 Star CloudPRNT
	AMQPS	5671/TCP	Star Micronics Cloud Service (*1

***1) Communication with Star Micronics Cloud Service is performed when the power is turned on, the status changes, or after a certain period of time has elapsed.**

(4) Network settings

The contents of the network settings can be checked by test printing. For details about the test printing procedure, refer to “4.1.2 Self-printing mode.”

Use Web Configuration or Star Quick Setup Utility to change the network.

Setting item	Input range	Default value:	Remarks
IP Address	0.0.0.0 to 255.255.255.254	0.0.0.0	
Subnet Mask	0.0.0.0 to 255.255.255.255	0.0.0.0	
Default Gateway	0.0.0.0 to 255.255.255.255	0.0.0.0	
DHCP	ENABLE / DISABLE	ENABLE	
DHCP Timeout	ENABLE / DISABLE	ENABLE	
DNS 1	0.0.0.0 to 255.255.255.254	8.8.8.8	
DNS 2	0.0.0.0 to 255.255.255.254	8.8.4.4	
"user" Login Password	- 1 to 31 ASCII characters - ASCII character - Distinction between upper case and lower case characters	"guest"	Camouflaged with "********” when changed from the initial value.
"root" Login Password	- 1 to 31 ASCII characters - ASCII character - Distinction between upper case and lower case characters	"public"	Always camouflaged with “********.”
Web Refresh Time (Sec.)	1 to 300	5	
9100 Multi Session	ENABLE / DISABLE	DISABLE	
9100 Data Timeout (Sec.)	0, 30, 40, 60, 120, 180, 360	0	
Disconnect Message	ENABLE / DISABLE	DISABLE	
TCP#9100	ENABLE / DISABLE	ENABLE	
TCP#9101	ENABLE / DISABLE	ENABLE	
LPR	ENABLE / DISABLE	ENABLE	
UDP#22222	ENABLE / DISABLE	ENABLE	
Telnet	ENABLE / DISABLE	DISABLE	
Certificate	Self-Signed/CA Signed	Self-Signed	
Create Self-Signed Certificate		Not exist	
Import CA-Signed Certificate		Not exist	
Star CloudPRNT Cloud Service	ENABLE / DISABLE	DISABLE	
Star CloudPRNT Service URL	- 1 to 511 ASCII characters	Blank	
Star CloudPRNT Polling time (Sec.)	- 1 to 7200 seconds	5	
Star CloudPRNT UserName	- 1 to 63 ASCII characters	Blank	
Star CloudPRNT Password	- 1 to 63 ASCII characters	Blank	
Star CloudPRNT HTTPS trust level	Use trusted CA-Certificate list / Use custom CA-Certificate / Accept all	Use trusted CA-Certificate list	
Star CloudPRNT NTP Server	Use Star NTP service Use custom NTP server	Use Star NTP service	0.pool.ntp.org
Star CloudPRNT TLS1.2 Cipher Suites Encryption Level	HIGH + MEDIUM / MEDIUM	HIGH + MEDIUM	
Star CloudPRNT TLS1.3	ENABLE / DISABLE	ENABLE	

Basic functions

3.1.1. LPD/LPR

The LPR protocol that LPD of this product supports conform to RFC1179 (partially not supported) and logical printer names in the list are used as queue names. LPR stands for “Line PRinter daemon protocol.” It is originally a protocol for printing provided as a UNIX printing system and currently supported standardly also by Windows (NT or later).

“LRP” may be used as an execution file name of the LPR print utility software. The print server (Daemon) corresponding to LRP is called LPD (Line Printer Daemon). LPD uses the TCP communication port 515.

- The reception buffer for printing data is 64 kB (shared with Raw Socket Print).
- This does not support banner printing.
- Specify “lp” when specifying a queue name in the port setting on the host device side.
  In addition, select “Enable” when addition of the LPR byte counter setting can be selected.

3.1.2. Raw Socket Print

This product supports Raw Socket Print communication for printing under a TCP/IP environment.

Raw Socket Print determines that all data communicated during a TCP session is data handled between the printer and the host device, and therefore performs bidirectional data distribution.

TCP communication port specification is as follows.

Item	Specification	Remarks
Communication port No.	TCP #9100	
Simultaneous connected session	1 or 8	- Factory setting is 1.
Data receiving timeout	0 (disabled)/30 s/40 s/60 s /120 s/180 s/300 s	- Default Settings, 0 (Disable) - Connection is shutdown forcedly at Timeout.

3.1.3. IP address specifications

3.1.3.1. General description

The IP address of this product is determined by the "static address (Static)" or "dynamic acquisition from the network with DHCP and ARP/Ping". For the factory settings, the static address (Static) = unregistered and DHCP = enabled.

ARP/Ping is enabled when an address cannot be obtained for Static or DHCP.

The acquired IP address information can be confirmed in the test printing (self-printing) display below.

```
**************************************
     Current IP Parameters Status
**************************************
 IP Address       :xxx.xxx.xxx.xxx
                    (*Protocol)
 Subnet Mask      :xxx.xxx.xxx.xxx
 Default Gateway   :xxx.xxx.xxx.xxx
```

* *Protocol*	:	The following address acquisition protocols are displayed in the parentheses for the IP address field.
(Static)	:	Static (Static address)
(DHCP)	:	Retrieved from DHCP server
(Ping ARP)	:	Retrieved using ARP/Ping
(Didn't obtain)	:	Could not retrieve IP address

3.1.3.2. Static address (Static)

If the static IP address, subnet mask, default gateway are registered, when the power is turned on, it is always turned on with fixed conditions. DHCP and ARP/Ping are disabled.

Since the static address is unregistered in the factory settings, acquire a dynamic address with DHCP or ARP/Ping and then register a static address by TELNET and HTTP (Web Configuration).

(→ See “3.1.5. TELNET server” and “3.1.4. Web Configuration.”)

3.1.3.3. DHCP

If the DHCP (Dynamic Host Configuration Protocol) is enabled, the IP address, subnet mask, and default gateway are obtained from the network. When obtaining the address information in DHCP, ARP/Ping is disabled.

Check whether the DHCP server is installed in the LAN.

When shipped from the factory, DHCP is valid. If returning the setting from a static address to DHCP, make a change by initializing the network settings or with TELNET and HTTP (Web Configuration).

(→ See “3.1.5. TELNET server” and “3.1.4. Web Configuration.”)

- DHCP Request varies depending on the DHCP Timeout setting.
  (→ See "4.1.4. Special function setting mode (at power on)")
  DHCP Timeout = ON : Occurs 3 times between TCP/IP start-up to 20 seconds afterwards.
  DHCP Timeout = OFF : Occurs infinite times until the address information is obtained.
- Address obtained by DHCP disappears when the power is turned OFF.

3.1.3.4. ARP/Ping

A temporary IP address by ARP/Ping can be set by registering a combination of the IP address and MAC address of the printer to the ARP (Address Resolution Protocol) table on the host device and transmitting a ping.

The temporary IP address set by the ARP/Ping is possible to receive when the fixed IP address is not specified, and the IP address is not obtained by DHCP. The address can be acquired by ARP/Ping only once.

- Subnet mask and default gateway cannot be specified for ARP/Ping.
- Address obtained by ARP/Ping disappears when the power is turned OFF.
  Refer to “10.1 Example of ARP/Ping execution” for execution examples.

3.1.4. Web Configuration

This product is equipped with an HTTP (Hyper Text Transfer Protocol) server which allows you to change network settings, display network information, monitor the printer status, etc. by accessing a browser.
The HTTP server uses the TCP-UDP communication port 80.

- The HTTP version is of the HTTP 1.1 specifications.
- Up to 2 devices can be connected at the same time.
  If three or more devices need to access the site, attempt connection (reload) 5 seconds after the previous two devices completes reading.
- Enable “JavaScript” in the web browser settings.
- User website [login not required]: http://IP Address/index.htm
  Example) http://192.168.10.1/index.htm
- Administrator website [login required]: http://IP Address/html/main.htm
  Example) http://192.168.10.1/html/main.htm
- Check and change of network settings and password settings [login required]
  Whether the contents have been written correctly to nonvolatile memory can be confirmed by specifying set print execution when settings are written. In addition, if the writing is successful, a printer reset is automatically performed.
- Displaying network information [login not required]
- Displaying printer information [login not required]
  The printer status display is updated automatically at the set refresh time.

Accounts (Usernames and passwords) accessible from the web browser are as shown below.
Items that can be checked and set differ depending on the account.

Account	Username	Password	Target
User	Login not required		Common user (Information display only)
Route user	"root"	"public" - 1 to 31 ASCII characters (can be changed)	System administrator (Information display & writing)

The following browser versions have been checked and are supported.

- Windows10 : Chrome 65, Microsoft Edge 41, Internet Explorer 11
- Windows 8.1 : Firefox 59
- Windows7 : Internet Explorer 11
- macOS 10.13.4 High Siera : Safari
- iOS 11.3 : Safari
- Android 8.1.0 : Chrome

Refer to “10.3.1 Web Configuration” for applicable encryption suites when using HTTPS.

3.1.5. TELNET server

3.1.5.1. Specification

The TELNET (TELecommunication NETwork) of this product allows you to change network settings such as IP parameters or passwords in an interactive menu format, or display network information or the printer status. The “Username” of each login account, password and access privileges are as shown in the following chart.

Account	Username (fixed)	Password	Target
User	"user"	"guest" (factory setting) - ASCII characters between 1 to 31 characters	Common user (Read-out Rights)
Root	"root"	"public" (factory setting) - ASCII characters between 1 to 31 characters	System administrator (Read-out/Writing)

- By specifying set print execution when settings are written, it is possible to confirm whether the contents have been written correctly to nonvolatile memory. In addition, if the writing is successful, a printer reset is automatically performed.
- Possible to be executed with a host device with a dedicated software (Windows) or by entering commands in an interactive menu format.

3.1.5.2. IP address setting

The input range for a fixed address and DHCP is shown in the following table.

Category	Setting item	Input range	Default value: (Factory setting)
Static address (Static)	IP Address	0.0.0.0 to 255.255.255.255	0.0.0.0
	Subnet Mask	0.0.0.0 to 255.255.255.255	0.0.0.0
	Default Gateway	0.0.0.0 to 255.255.255.255	0.0.0.0
Dynamic address	DHCP	ENABLE / DISABLE	ENABLE

<Note> If you set a fixed address, it will automatically be "DHCP: DISABLE".
When set to "DHCP: ENABLE" all the fixed address fields will automatically become 0.0.0.0.

3.1.5.3. Password setting

The password input range is shown in the following table.

Setting item	Input range	Initial value (Factory setting)
"user" Login Password (*1)	- 1 to 31 ASCII characters - ASCII characters (Upper case/Lower case)	"guest"
"root" Login Password	- 1 to 31 ASCII characters - ASCII characters (Upper case/Lower case)	"public"

*1) The “user” login password is displayed with the default value (“guest”), but if changed to other than the default, it is camouflaged with “********.”

3.1.5.4. Raw Socket Print Setting

The Raw Socket maximum input range of the number of connected sessions is shown in the following chart.

Setting item	Input range	Initial value (Factory setting)
9100 Multi Session	ENABLE / DISABLE	DISABLE

3.1.5.5. Disconnect warning print setting

The input range is shown in the following table.

Setting item	Input range	Initial value (Factory setting)
Disconnect Message	ENABLE / DISABLE	DISABLE

3.1.5.6. Status display, etc.

Status display is possible for the following items.

(1) Display firmware version

Displays the version number of the main program and boot program.

(2) Display current IP parameters / status

Displays IP parameters in operation.

The protocol used to retrieve the address is displayed inside the parenthesis of the IP address.

(3) Display printer device ID

Displays the device ID of the printer. Format conforms to IEEE1284.

(4) Display printer status

Displays the printer status in hexadecimal dump format.

3.1.6. Print disconnect warning

If any of the following network errors are detected, the printer will automatically print a warning.

(1) Link down [Physically disconnected]

* See "4.3 LED displays and errors"

A warning is printed when a link-down state [physically disconnected] has continued for 4 seconds.

(2) Link down [IP address not obtained]

* See "4.3 LED displays and errors"

A warning is printed when a link-down state [IP address not obtained] has been detected.

However, if DHCP is enabled, when the IP address is waiting acquisition (state is not a time-out), warning printing is not performed.

This function can be enabled/disabled by TELNET and HTTP (Web Configuration).

It is disabled in the factory setting.

(→ See "3.1.5. TELNET server" and “3.1.4. Web Configuration.”)

In addition, the setting status can be confirmed with test printing (self-print).

Print sample

3.1.7. SSL/TLS communication

[General description]

This product can encrypt HTTPS and AMQPS communication using SSL/TLS (Socket Security Layer/Transport Layer Security).

3.1.7.1. Specifications for when server is operating

The services in which the printer operates as a SSL/TLS server are the following.

- Web Configuration

[Specifications]

<Communication specifications>

SSL/TLS version	: TLS1.2 (SSL3.3)
Application protocol	: HTTPS (Server Authentication)(*1)
TCP communication port No.	: 443
Certificate	: Self-signed certificate or CA-signed certificate
Encryption algorithm	: AES 128/256, RC4, 3DES
Hash algorithm	: SHA-256, SHA-1, MD5

(*1) Refer to “10.3.1 Web Configuration” for applicable encryption suites.

Regarding the certificate required to authenticate with the client's device, either a self-signed certificate or a CA-signed certificate needs to be registered.

You can check the basic settings (certificate selection, requirement for certificate registration) by self-print.

3.1.7.1.1. Self-signed certificates

Creating and signing a server certificate on the web settings screen of the printer main unit.

The input items on the "Self-Signed Certificate" screen of the web settings are shown in the following table.

Input items when creating a certificate

Variable name	Max length of string	*[Example]*	Default value
Country Name (2 letter code)	2	*JP*	(Blank)
State or Province Name	128	*Shizuoka city*	(Blank)
Locally Name (e.g. city)	128	*Shimizu-ku, Nanatshushinya*	(Blank)
Organization Name (e.g. company)	128	*Star Micronics Co., ltd.*	(Blank)
Domain (IP Address)	128	*192.168.1.175*	(Blank)
Expiration Date (e.g. YYYY/MM/DD)	2018.01.01 to 2049.12.31	*2020/12/31*	(Blank)

- To register a certificate in the web browser, click [Create Self-Signed Certificate] and then click [Download].
- Once the certificate has been registered, it cannot be deleted by initializing the Network settings.

  You can delete a certificate file by clicking [Delete] after clicking [Create Self-Signed Certificate].
- Enter the expiration date of the certificate in the "Expiration Date" field.

  ” You can specify an expiration date up to "2064.12.31". However, the web browser will misinterpret the expiration date as 1950 or later and cause an error when specifying a date from 2050 or later. Consequently, the maximum date is fixed at "2049.12.31".

  In addition, the minimum date for the expiration date is fixed at "2021.01.01.” and the time is fixed at 00:00:00 (GMT) both on the minimum and maximum dates.
- The minimum required items for creating a certificate are the "Domain" and "Expiration", but we recommend you input information for all items.
- Enter the printer's IP address to “Domain.” Items of Subject Alt Name (SAN) are generated based on the entered values.

  Refer to the attached “10.2, Example procedures for registering SSL/TLS certificates” for an example procedure for creation and signing of the self-signed certificate.

3.1.7.1.2. CA signed certificate

You can import a server certificate created externally and signed by CA (Certification Authority) and a private key to the printer NIC. The server certificate signed by the CA (Certification Authority) and private key can be imported to the printer and used.

<Server certificate specification>

- Encoding type: Base64 (filename extension = PEM)
- Types of the certification file: PKCS #1
- Key length: RSA 2048 bits or 1024 bits
- Register the CA (Certification Authority) above as a "Trusted Root Certification Authorities" in the web browser.
- Delete the certificate registered to the NIC by clicking [Delete] after selecting [Import CA-Signed Certificate]. However, the [Delete] button is disabled unless a CA-signed certificate a CA-signed private key are registered.
- Once the certificate has been registered, it cannot be deleted by initializing the network. To delete the certificate file, click [Import CA-Signed Certificate] and then click [Delete] on the SSL/TLS settings screen.

  An example procedure for importing a CA-signed certificate to NIC is described in the attached "10.2. Example procedures for registering SSL/TLS certificates.”

3.1.7.2. Specifications when server is operating

The services in which the printer operates as a SSL/TLS client are the following.

- Star CloudPRNT
- Star Micronics Cloud Services

Specification

<Communication specifications>

SSL/TLS version	: TLS1.2, TLS1.3
Application protocol	: HTTPS, AMQPS (*1)
TCP communication port No.	: 443, 5671
Certificates	: Preinstalled CA certificate or custom CA certificate
Encryption algorithm	: AES 128/256 (GCM, CBC), ChaCha20 (Poly1305), RC4, 3DES
Hash algorithm	: SHA-384, SHA-256, SHA-1, MD5

(*1) Refer to “10.3.2 Star CloudPRNT” for applicable encryption suites.

3.1.8. Star Micronics Cloud Services

If you connect the printer to Star Micronics Cloud Services, helpful cloud services for operating your store are available for free.

<Services for stores>

Device Monitor	:	You can check the printer status and the number of receipts in the graph.
Digital Journal	:	You can check the digitized receipt data in the cloud at any time.
PromoPRNT	:	You can configure the setting for issuing paper coupons and manage the schedule in the cloud.

<Services for developers>

Device Manager API	:	Printer status and receipt printing data can be acquired by webAPI. Printer settings can be remotely configured using webAPI.
Star Quick Setup Utility Customizer	:	The Start Quick Setup Utility display items can be customized.
Star Document Markup Designer	:	Print data by Star Document Markup can be create using GUI.

A wide range of other services will be also available. For details, please access the following website.
Star Micronics Cloud Services (www.starmicronicscloud.com)

3.1.9. Star CloudPRNT function

[General description]

The Star CloudPRNT function enables print control (printing, etc.) by polling via a network between a remote server*1) and this product.

The response to the polling of printer information (status, printer identifier, etc.) from this product to the remote server notifies the product that data has been prepared on the remote server. In this case, it is possible for this product to acquire the print data from the remote server and print the data.

***1) Communication with the product must be installed on the remote server based on the Star CloudPRNT specifications.**

[Specifications]

<Communication specifications>

TCP/IP version	:	TCP/IP v4
Communication protocol	:	HTTP/HTTPS
Communication data format	:	Compatible with REST/JSON format
Communication session start	:	Started from the product side. [When not printing (*1)] Pinter information is sent to the server by POST request. [When printing] Printer data is acquired from the server by GET request.
Communication session end	:	Ended from the server side. [When not printing (*2)] When there is data on the server, print job notification, non-printing control commands, and other information is sent to the printer. [When printing] The print data on the server is sent to the printer.

***2) Control other than status notification and printing**
This communication session performs continual polling at the specified polling cycle.

<Request/response specifications between server and printer>

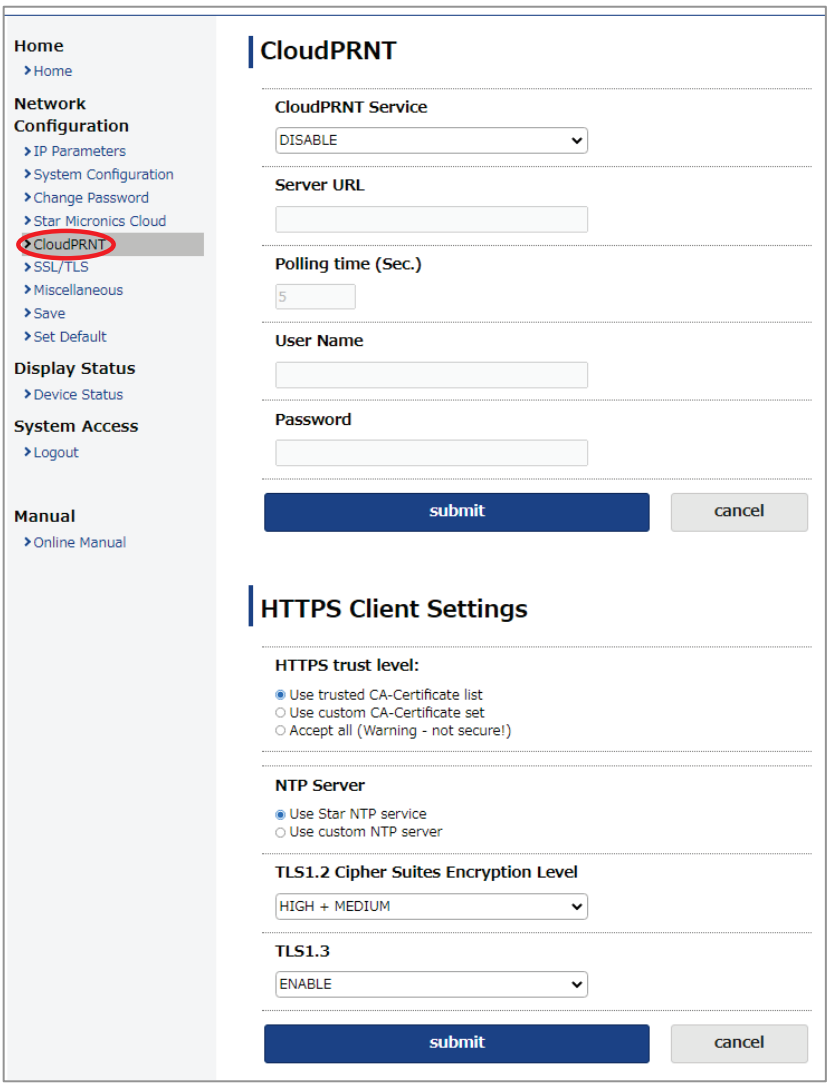
[Contents of request sent from printer to server (JSON format)]

```
"status"                : "< ASB Hex format >",
"printerMAC"            : "< Ethernet MAC address >",
"uniqueID"              : "< server assigned ID >",
"statusCode"            : "< description >",
"jobToken"              : "< token string >",
"printingInProgress"    : bool,
"clientAction"          : [{
"request"               : "< request type >",
"result"                : "< request result >"
                          }],
"barcodeReader"         : [{
"name"                  : "< device logical name >",
"status"                : {"connected": bool, "claimed": bool},
"scan"                  : [{"data" : "< scanned barcode character sequence >"}]
                          }],
"display"               : [{
"name"                  : "< device logical name >",
"status"                : {"connected": bool}
                          }]
```

[Contents of response sent from server to printer (JSON format)]

```
"jobReady"              : true | false,
"mediaTypes"            : ["< content media type >"],
"jobToken"              : "< string token >",
"deleteMethod"          : "DELETE" | "GET",
"clientAction"          : [{"request" : "< request type >" , "options" : "< request parameters >"}],
"claimBarcodeReader"    : ["< device name >"],
"display"               : [{"name" : "< device name >" , "message" : "< message markup >"}]
"jobGetUrl"             : "< alternative URL for job GET >",
"jobConfirmationUrl"    : "< alternative URL for job confirmation >"
```

<Web Configuration UI setting specifications>



- Items set from the CloudPRNT menu of the product Web Configuration UI.

  - CloudPRNT Service : Set whether the service is enabled or disabled. Factory default setting = Disabled
  - Server URL : Enter the server URL such as "http://...."
  - Polling time : Enter the polling interval (seconds). Factory default setting = 5 sec
  - User Name/Password : When necessary, register cloud server security information. (option)
  - HTTPS Client Settings : Set the certificate (PEM format) according to the server-side specifications when conducting secure communication with the server.
  - NTP Server : Set the NTP server used for time information inquiries. The StarNTP service (0.pool.ntp.org) is selected as the factory default setting. As necessary, enter the URL of the user's own NTP server.
  - TLS1.2 Cipher Suites Encryption Level :
    Set the encryption level of TLS 1.2 cipher suite. For details, refer to "10.3.2 Star CloudPRNT." Factory default setting = HIGH + MEDIUM.
  - TLS1.3 : Set whether TLS1.3 is enabled or disabled. For cipher suites supported when TLS1.3 is enabled, refer to "10.3.2 Star CloudPRNT." Factory default setting = Enabled

  For details of the server-side specifications, refer to the separate Developer Guide.

3.2. USB interface

3.2.1. USB-C port

(1) Communication standard : USB2.0 Full-speed Device
(2) Device class : Printer class
(3) Connector : USB-C

To connect a device, use the USB cable that was provided with the printer or a USB-certified cable.
In addition, be sure to fully verify operation with the actual device before beginning actual use.

3.2.2. USB-A port

(1) Standard : USB2.0 Full-speed Embedded Host, USB BC1.2 CDP, AOA
(2) Power supply : 5 V@1.5 A (max)
(3) Connector : USB-A

The operation of this port changes according to the devices.
Refer to the following for supported devices and their operation.

A device that performs communication as the USB host and supply power of 5 V/0.5 A

- Customer display (SCD222U)
- Barcode reader (BCR-POP1)
- HID device (keyboard interface)
- USB flash drive

A device that performs communication as the USB host and supply power of 5 V/1.5 A

- Android devices (AOA compatible devices with the OS version 9 or later)

A device that only supplies power of 5 V/1.5 A (communication as USB host not possible)

- Device conforming to USB BC1.2 CDP (some Android devices, iOS devices, etc.)

USB devices other than the above cannot perform communication but supplies power of 5 V/0.5 A.

Note 1) When communication cannot be established with the connected device, the fact is displayed with LED.
Refer to "4.3 LED displays and errors."

2) When connecting an Android device to the USB-A port for the purpose of communication, start the Android device, connect the device to the printer using the USB cable, and then turn ON the printer.
In addition, confirm that the version of Android OS is version 9 or later.
Use a USB-certified cable for connection with a device.
However even when the condition is satisfied, operation is not guaranteed.
Be sure to fully verify operation with the actual device before beginning actual use.

3.2.3. Commercially available devices that can be used

The following is a commercially available USB device that has been tested and can be connected to the USB-A.

- HID device

  Target : HID device with USB keyboard interface

  <Notes>

  The operation of all commercially available HID devices is not guaranteed. Be sure to fully verify operation with the actual device before beginning actual use.

- USB flash drive

<Connectable USB flash drive specifications>

File system: FAT12/16/32
Device class: Mass Storage
Devices subclass: SCSI transparent command set
Device protocol: Bulk-Only Transport

<Application>

Execute printer F/W rewrite by saving the Star Configuration Format and printer F/W data in the USB flash drive.

<Notes>

1) **Even when the USB flash drive satisfies the above specifications, it may not be possible to use the device when an extension cable is used, or for other reason such as compatibility with the printer USB host. In such a case, use another USB flash drive.**
2) **For details about the Star Configuration Format and the F/W rewrite procedure, refer to the download site in "6. Firmware update."**

3.3. Printing by multiple interfaces

This printer supports printing using multiple interfaces, and the interfaces can be dynamically switched during use without turning the printer power off/on or disconnecting and reconnecting the interface cable.

There is one receiving buffer for commands and printing data, and the interface of the data which was received first occupies the receiving buffer. When the receiving buffer is kept empty for a certain length of time, the reeving buffer can be released to change the interface. The interface change switching time can be changed by the memory switch setting.

Refer to “7.11. MSWE” for memory switch settings.

The devices (command and printing data sources) which can connect to and communicate with each interface are as shown in the table below.

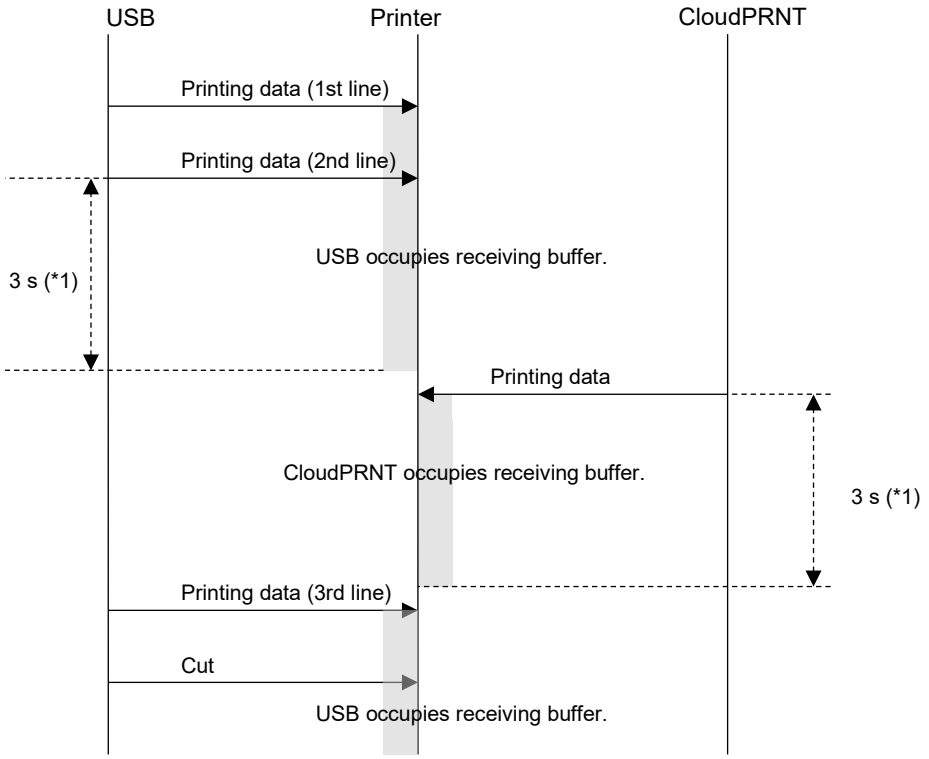
	USB-A(CDP)	USB-C	Wired LAN
iOS	-	-	✓
Android	✓	-	✓
Windows	-	✓	✓
Linux	-	✓	✓
Mac	-	✓	✓

<Restrictions>

When using multiple interfaces in parallel and the data transmission interval is equal to or longer than the interface switching wait time, then data may become mixed.

For example, when sharing a single printer with USB CloudPRNT, and as shown in the figure below the transmission interval for USB printing data (2nd line) and printing data (3rd line) is 3 seconds (*) or more, then mixing of the CloudPRNT printing data occurs.

Example) Cases when data mixing occurs with USB and CloudPRNT



***1) When the interface switching wait time is default (3 seconds), data mixing can be prevented by paying attention to the following.**
When sending printing data from the application to the printer, send one entire document all at once without a transmission interval within the document.
When the transmission interval within a document is 3 seconds or more, set a longer interface switching wait time.

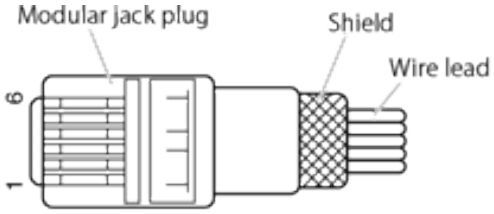
3.4. Connector to drive external device

This product is equipped with a drive circuit to operate external devices (optional external buzzer, etc.).
A connector to drive external device (6P modular jack connector) is provided as the output side of the drive circuit.
Connect the cable to this connector when using the drive circuit.
Please prepare a cable by yourself. The recommended cable specifications are as follows.

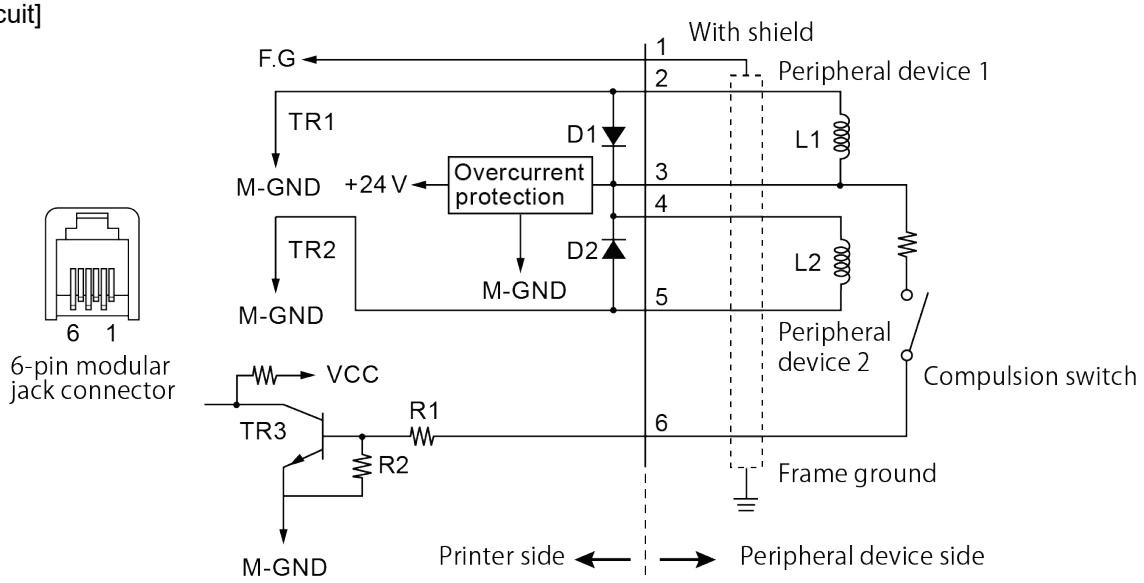
[Recommended cables]

RJ11 plug (6P6C)

Pin No. 1 (frame ground) shall be a shield wire.



[Circuit]



Protection circuit: Overcurrent protection 1.5 A with overvoltage protection diode (D1, D2)
Drive circuit: TR1.2 max. 1.0 A
Input circuit: R1 =10 kΩ, R2 = 47 kΩ

Note 1) External device 1 and external device 2 cannot be driven simultaneously.

2) When a device other than an external buzzer such as a cash drawer is connected, make sure that the duty is 20% or lower.

3) When a device other than an external buzzer and melody speaker is connected, never use the external buzzer drive command. <u>Otherwise, the connected device and this circuit may become damaged.</u>

4) The condition of the compulsion switch can be found in the status.

5) L1 and L2 shall be 24 Ω or higher.

4. Operating section and functions

4.1. FEED button

The FEED button enables functions such as paper feed and self-printing.
The following details each function:

4.1.1. Paper feed

Press this button offline to feed and cut paper.
This function can be disabled by changing the setting of the memory switch. (→ Refer to “7.12. MSWF.”)

4.1.2. Self-printing mode

In self-printing mode, information such as firmware version, connection of melody speaker, model name, memory switch settings, and network settings is printed.

< Method to enter self-printing mode at power on >

1. To enter self-printing mode, turn on the power while holding down the FEED button.
2. After self-printing has ended, normal mode is automatically resumed.

< Method to enter self-printing mode after power on >

1. After turning on the power, open the printer cover and hold down the FEED button for 5 seconds or more.
2. When the blue LED starts flashing, release the FEED button.
3. When the blue LED is flashing/the red LED is off, close the printer cover.
   If any condition other than the blue LED flashing/the red LED off occurs by accidentally pressing the FEED button, hold down the FEED button until the blue LED starts flashing/the red LED turns off, and then close the printer cover.
   The blue LED turns on solid/the red LED turns off, and the printer is reset to enter self-printing mode.
4. After self-printing has ended, normal mode is automatically resumed.

4.1.3. Hexadecimal dump printing mode

1. Open the printer cover, and turn on the power while holding down the FEED button.
   When the blue LED starts flashing, release the button. (Note: Release the button while the blue LED is flashing.)
2. If the blue LED turns on solid by holding down the button, turn off the power, and then repeat the steps from the beginning.
3. When the printer cover is closed, the title “Hex Dump Mode” is printed to enter hexadecimal dump printing mode. From then onward, received data will be printed in hexadecimal.
   To end the hexadecimal dump printing function, turn off the device.

4.1.4. Special function setting mode (at power on)

● Procedure for special function settings: A → B → C→ D

A: Entering special mode

Cover open + Press the multi-function button + Turn on the power

→ Blue LED flashing (Cycle: 0.25 sec.) for 5 sec.

→ Blue LED lighting

→ FEED button Off

→ Press the FEED button 3 times.

→ Entering special mode

B: Selecting mode

Press the FEED button → LED changes: B1 ⇒ B2 ⇒ B3 ⇒ B4 ⇒ B1 ⇒ ...

B1 The blue LED turns off/the red LED turns on solid = Cutter setting mode

B2 The blue LED turns off/the red LED flashes (every 0.5 sec) = DHCP timeout setting mode

B3 The blue LED turns on solid/the red LED turns on solid = SB serial number setting mode

B4 The blue LED flashes (every 0.5 sec)/the red LED turns off = MSW initialization mode

→ Close the cover → Setting mode is determined

C: Selecting setting items

C1 Cutter setting mode → Press the FEED button → LED changes: C1-1 ⇔ C1-2 → To D: Saving the setting

C1-1 The blue LED flashes (every 0.25 sec) = The cutter is enabled

C1-2 The red LED flashes (every 0.25 sec) = The cutter is disabled

C2 DHCP timeout setting mode → Press the FEED button → LED changes: C2-1 ⇔ C2-2 → To D: Saving the setting

C2-1 The blue LED flashes (every 0.25 sec) = DHCP timeout is enabled

C2-2 The red LED flashes (every 0.25 sec) = DHCP timeout is disabled

C3 USB serial number setting mode → Press the FEED button → LED changes: C3-1 ⇔ C3-2 → To D: Saving the setting

C3-1 The blue LED flashes (every 0.25 sec) = USB serial number is enabled

C3-2 The red LED flashes (every 0.25 sec) = USB serial number is disabled

C4 MSW Initialization mode

MSW initialization → Hardware reset

D: Saving the setting

Hold down the FEED button for 1 sec = The setting is saved

→ Hardware reset

4.1.5. Special function setting mode (during normal standby)

● Special function setting procedure A → B → C → D

A: Entering special mode

Open the cover + Press the FEED button for 5 sec or more

→ When the blue LED starts flashing, release the FEED button.

→ Special mode is entered.

B: Selecting mode

Press the FEED button for 1 sec or more → LED changes: B1 ⇒ B2 ⇒ B3 ⇒ B1 ⇒ ...

B1 The blue LED flashes (every 0.5 sec)/the red LED turns off = Self-printing is executed

B2 The blue LED flashes (every 0.5 sec)/the red LED flashes (every 0.5 sec) = Network setting initialization mode

B3 The blue LED turns off/the red LED flashes (every 0.5 sec) = Hold print control/hold print status setting mode → Close the cover → Setting mode is determined

(B1 When self-printing mode is selected/determined, the printer is reset to execute self-printing and then resume normal mode.)

(B2 When network setting initialization mode is selected/determined, the network setting is initialized and the printer is reset to self-print the network setting and then resume normal mode.)

C: Selecting setting items

C3 Hold print control/hold print status setting mode → Press the FEED button → LED changes: C3-1 ⇔ C3-2 → To D: Saving the setting

C3-1 The blue LED flashes (every 0.25 sec)/the red LED turns off = Hold print control/hold print status is enabled

C3-2 The blue LED turns off/the red LED flashes (every 0.25 sec) = Hold print control/hold print status is disabled

D: Saving the setting

Hold down the FEED button for 1 sec = The setting is saved

→ The printer is reset to execute self-printing and then resume normal mode.

4.2. RESET switch

4.2.1. Initializing the communication settings

The network settings in (4) of 3.1 Ethernet can be initialized by initializing the network settings.

Enter network setting initialization mode by turning on the power while holding down the reset switch on the back using a pen or other pointed objects.
When the network LED (green) starts flashing, release the reset switch.
Hold down the FEED button to reset the printer and complete the initialization of the network settings. Release the FEED button.
After the network settings have been initialized, normal mode is automatically resumed.

The network settings can be initialized by using the RESET switch as described in this chapter, and by opening the printer cover. For details, refer to “4.1.5 Special function setting mode (during normal standby).”

4.3. LED displays and errors

4.3.1. Automatic recovery errors (online)

Error type	Power LED	Error LED	Cause	Recovery method
Head temperature high (printing stopped)	Flashing (every 1 sec)	Off	Head temperature is high.	Recovers automatically when head temperature drops.
Board temperature high (printing stopped)	Flashing (every 4 sec)	Off	Board temperature is high.	Recovers automatically when board temperature drops.
F/W rewriting (Printing stopped)	Continuous alternating flashing (irregular cycle)	Continuous alternating flashing (irregular cycle)	The printer F/W is being rewritten.	Recovers automatically when F/W rewriting is completed.

4.3.2. Recoverable errors (offline)

Error type	Power LED	Error LED	Cause	Recovery method
Cover open error	Solid on	Solid on	The cover is open.	Close the cover.
No-paper error	Solid on	Flashing (every 1 sec)	No paper	Set paper.
Paper jam error (*1)	Solid on	Flashing (every 0.25 sec)	Paper jam occurred.	Remove any jammed paper. If paper jam occurs frequently, clean the parts.

*1) Supported by F/W Ver. 2.1 and later.

4.3.3. Unrecoverable errors (offline)

Error type	Power LED	Error LED	Cause	Recovery method
Auto cutter error	Off	Flashing (every 0.25 sec)	Paper is jammed or the cutter is malfunctioning.	Turn off the power and eliminate the cause of the error. After confirming that the cutter blade has returned to the home position, turn on the power. If the error cannot not be eliminated, a repair is required.
Supply voltage error	Flashing (every 2 sec)	Flashing (every 2 sec)	Supply voltage is abnormal (during standby).	A repair is required.
Head thermistor error	Flashing (every 1 sec)	Flashing (every 1 sec)	Head thermistor resistance is abnormal.	A repair is required.
FLASH error	Off	Flashing (4 times)	FLASH access is faulty.	A repair is required.
EEPROM error	Flashing (every 0.5 sec)	Flashing (every 0.5 sec)	EEPROM access is faulty.	A repair is required.
RAM error	Off	Solid on	External RAM access is faulty.	A repair is required.
F/W rewriting error	Off	Flashing (7 times)	- The received F/W data is abnormal. - A verify error was detected after rewriting.	Turn off the power and then on again. If the same error occurs, a repair is required.

For a repair, please contact the dealer.

4.3.4. Network link status

Type	Network LED	Cause	Recovery method
Link up	Solid on	TCP/IP communication is enabled.	
Link down [Physical disconnection]	Off	Connection has been physically cut off. (The Ethernet link is down.)	Check the connection of the communication cable between the printer and the hub router and turn on the power again.
Link down [IP address not acquired]	Flashing (every 0.25 sec)	< DHCP enabled > IP address cannot be acquired from the network.	Check the wiring path and the DHCP server, and then turn on the power again. (*1)
		< DHCP disabled > IP address = 0.0.0.0 is set.	Initialize the network settings and set a correct IP address. (*1)

(*1) To set a temporary IP address, run ARP/Ping.

4.3.5. USB host status

Type	Power LED	Error LED
Connection of incompatible USB device	Continuous simultaneous flashing (for 5 sec, every 0.5 sec)	Continuous simultaneous flashing (for 5 sec, every 0.5 sec)
Connection of incompatible USB HUB	Continuous alternating flashing (for 5 sec, every 0.5 sec)	Continuous alternating flashing (for 5 sec, every 0.5 sec)

5. Maintenance

For comfortable and safe use, perform maintenance periodically.

Please read the following precautions carefully before performing maintenance.

Recommended maintenance interval: Every 6 months or every after printing of 40 rolls (2 km/500,000 lines.

⚠ Warning

- Be sure to turn off the power before performing maintenance.
  Otherwise, it may cause an electric shock or injury if the power is on during maintenance.
- Do not perform maintenance with wet hands.
  Otherwise, it may cause an electric shock.
- Periodically maintain the power cable.
  If usage of a damaged (e.g. cracked) cable is continued, it may cause fire or electric shock.

⚠ Note

- Do not use benzine, thinner, trichlorethylene, and ketone solvents. Do not also dampen or damage the interior of this product during maintenance. Otherwise, it may lead to malfunctions.
- Do not touch any of the other interior sections that are not noted in this product manual. Otherwise, it may cause an injury or burns.
- The thermal head is easily damaged. Be careful not to damage it while cleaning.
- Do not clean the thermal head immediately after printing when it is still hot.
- There is risk that static electricity may damage the head after the thermal head is cleaned so be careful about static electricity.
- It is recommended to conduct maintenance on a daily basis regardless of the recommended maintenance intervals above.

5.1. Daily maintenance

5.1.1. Appearance/exit

- Wipe dust and dirt off the plastic area using a dry, soft, and clean cloth.
- In particular, immediately remove sticky dust and dirt attributable to label adhesives.
  Failure to do so may cause paper jamming.
- If the device is very dirty, gently wipe off the dirt with a soft cloth wrung out of water containing a very small amount of neutral detergent. Then, dry it with a dry, soft cloth.

5.1.2. Thermal head

- Apply alcohol solvent (ethanol, isopropyl alcohol) to a cotton swab (or soft cloth), and wipe the thermal area of the head.
- Remove the accumulated adhesive and paper powder from the surface of the thermal head.

5.1.3. Platen rubber roller

- Wipe dirt off the rubber roller with a dry, soft cloth.
- Clean the entire surface of the rubber roller while rotating the roller.

5.1.4. Paper holder

- Remove dirt, dust, and paper particles, etc. from the feeding path.
- In particular, immediately remove sticky dust and dirt attributable to label adhesives.
  Failure to do so may cause paper jamming.

5.2. Actions in the event of paper jamming

- Open the printer cover and remove jammed paper.
  To avoid part damage, never pull-out jammed paper forcibly with the printer cover closed.
- If the printer cover does not open, turn off the power once and on again to open the cover.
- If the printer cover does not open even after turning on the power again, the cutter blade may not be in the correct position (with the blade out).
  In that case, open the front cover and turn the cutter knob to return the blade to the correct position.
- Before starting operation, be sure to remove adhesive from the feeding path.

6. Firmware update

The following are the methods for updating the firmware of this product.

Method	Reference
Star Quick Setup Utility	Update the firmware using an iOS or Android device. iOS : App Store Android : Google Play
Star Windows Software	Rewrite the firmware using a Windows device. Download site
USB flash drive	Rewrite the firmware using a USB flash drive. Procedure for Firmware Rewriting Using USB Flash Drive
Star CloudPRNT (*)	Rewrite the firmware remotely from the remote server. Star CloudPRNT Protocol Developer's Guide
SMCS Device Manager API (*)	Using the OAuth 2.0 authorization code flow, rewrite the firmware remotely with WebAPI. Device Manager API

*) Solutions for developers to be incorporated into the application

7. Memory switch

Reading of the memory switch is carried out when the power is turned on or when a reset command is executed.
If settings have been changed, they are enabled by turning on the power again or by using a reset command.
The settings of the memory switch can be rewritten by any of the following methods:

- Command
- Star Quick Setup Utility
- Star Windows Software

7.1. MSW0

bit	Function	OFF/"0"	ON/"1"	Note
F				
E	Special location of use	(See the table below.)	(See the table below.)	*3
D	Special location of use	(See the table below.)	(See the table below.)	*3
C	Special location of use	(See the table below.)	(See the table below.)	*3
B				
A	Multi-byte character	(See the table below.)	(See the table below.)	*1
9	Multi-byte character	(See the table below.)	(See the table below.)	*1
8	Multi-byte character	(See the table below.)	(See the table below.)	*1
7				
6				
5	SHIFT-JIS Kanji character mode	Enabled	Disabled	*2
4	Specification for location of use	SBCS (Single-byte character	MBCS (Multi-byte character	*4
3	(Reserved)			
2				
1				
0				

*1) Multi-byte characters (For MSW0-4, this is enabled only when MBCS is set.)

N	MSW0-A	MSW0-9	MSW0-8	Multi-byte character
"0"	0	0	0	Simplified Chinese
"1"	0	0	1	Japanese Kanji character
"2"	0	1	0	Traditional Chinese (BIG5)
"3"	0	1	1	Simplified Chinese
"4"	1	0	0	(Reserved)
"5"	1	0	1	(Reserved)
"6"	1	1	0	(Reserved)
"7"	1	1	1	(Reserved)

*2) SHIFT-JIS Kanji character mode

This setting is enabled only when Japanese Kanji character is selected and MBCS is set.

Refer to the table below for the details of the JIS Kanji character mode/SHIFT-JIS Kanji character mode when Japanese Kanji character is selected.

(JIS Kanji character mode is disabled when the power is turned on.)

< SHIFT-JIS/JIS specifications when Japanese Kanji character is selected >

SHIFT-JIS Kanji character mode	JIS Kanji character mode	Print mode
Disabled	Disabled	Japanese Kanji character ANK mode (MSW0-5 = “1”)
Enabled	Disabled	SHIFT-JIS Kanji character mode (MSW0-5 = “0”)
Disabled	Enabled	JIS Kanji character mode
Enabled	Enabled	JIS Kanji character mode

*3) Special locations of use

Select locations of use requiring dedicated specifications such as character type and baseline.

N	MSW0-E	MSW0-D	MSW0-C	Location of use	Specification overview	Note
"0"	0	0	0	Standard		
"1"	0	0	1	Thailand	Thai 1-path specification is supported. Dedicated ANK fonts are	Page mode, international character setting, slash 0 selection, and large fonts are
"2"	0	1	0	(Reserved)		
"3"	0	1	1	(Reserved)		
"4"	1	0	0	(Reserved)		
"5"	1	0	1	(Reserved)		
"6"	1	1	0	(Reserved)		
"7"	1	1	1	(Reserved)		

*4) Initial values of UTF-8 fuzzy character setting by specification for location of use.

MSW0-4	Specification for location of use	Initial value of UTF-8 fuzzy character setting
0	SBCS (Single-byte character countries)	Single-byte characters are prioritized.
1	MBCS (Multi-byte character countries)	Two-byte characters are prioritized.

7.2. MSW1

bit	Function	OFF/"0"	ON/"1"	Note
F				
E				
D				
C				
B				
A				
9				
8				
7				
6	Font type (Font-A, Font-B)	Standard font	Large font	*2
5				
4	Zero style	Normal zero	Slashed zero	
3	International characters	(See the table below.)		*1
2	International characters	(See the table below.)		*1
1	International characters	(See the table below.)		*1
0	International characters	(See the table below.)		*1

*1) International characters

n	MSW1-3	MSW1-2	MSW1-1	MSW1-0	International characters
"0"	0	0	0	0	USA
"1"	0	0	0	1	France
"2"	0	0	1	0	Germany
"3"	0	0	1	1	UK
"4"	0	1	0	0	Denmark 1
"5"	0	1	0	1	Sweden
"6"	0	1	1	0	Italy
"7"	0	1	1	1	Spain 1
"8"	1	0	0	0	Japan
"9"	1	0	0	1	Norway
"A"	1	0	1	0	Denmark 2
"B"	1	0	1	1	Spain 2
"C"	1	1	0	0	Latin America
"D"	1	1	0	1	Korea
"E"	1	1	1	0	Ireland
"F"	1	1	1	1	Legal

< Note >

This setting is disabled when Japanese Kanji character is selected and MBCS is set. International character setting is fixed to “JAPAN (n = 8).”

*2) Font type (Font-A, Font-B)

Large fonts are not compatible with all of the code page types. Accordingly, even if a large font has been selected by this MSW, the selection may be disabled in some code pages.

The following table shows the compatibility with large fonts by code page.

In the table, the code pages that are not compatible with large fonts will output characters in a standard font even if a large font is selected by this MSW.

(✓: Large fonts compatible, -: Large fonts not compatible)

PAGE	Code page	Compatibility with large fonts
0	Normal	✓
1	CodePage437 (USA,Std. Europe)	✓
2	Katakana	-
3	CodePage437 (USA,Std. Europe)	✓
4	Codepage 858 (Multilingual)	✓
5	Codepage 852 (Latin-2)	✓
6	Codepage 860 (Portuguese)	✓
7	Codepage 861 (Icelandic)	✓
8	Codepage 863 (Canadian French)	✓
9	Codepage 865 (Nordic)	✓
10	Codepage 866 (Cyrillic Russian)	✓
11	Codepage 855 (Cyrillic Bulgarian)	✓
12	Codepage 857 (Turkey)	✓
13	Codepage 862 (Israel (Hebrew))	-
14	Codepage 864 (Arabic)	-
15	Codepage 737 (Greek)	✓
16	Codepage 851 (Greek)	✓
17	Codepage 869 (Greek)	✓
18	Codepage 928 (Greek)	✓
19	Codepage 772 (Lithuanian)	✓
20	Codepage 774 (Lithuanian)	✓
21	Codepage 874 (Thai)	-
32	Codepage 1252 (Windows Latin-1)	✓
33	Codepage 1250 (Windows Latin-2)	✓
34	Codepage 1251 (Windows Cyrillic)	✓
64	Codepage 3840 (IBM-Russian)	✓
65	Codepage 3841 (Gost)	✓
66	Codepage 3843 (Polish)	✓
67	Codepage 3844 (CS2)	✓
68	Codepage 3845 (Hungarian)	✓
69	Codepage 3846 (Turkish)	✓
70	Codepage 3847 (Brazil-ABNT)	✓
71	Codepage 3848 (Brazil-ABICOMP)	✓
72	Codepage 1001 (Arabic)	-
73	Codepage 2001 (Lithuanian-KBL)	✓
74	Codepage 3001 (Estonian-1)	✓
75	Codepage 3002 (Estonian-2)	✓
76	Codepage 3011 (Latvian-1)	✓
77	Codepage 3012 (Latvian-2)	✓
78	Codepage 3021 (Bulgarian)	✓
79	Codepage 3041 (Maltese)	✓
96	Thai Character Code 42 (Thai)	-
97	Thai Character Code 11 (Thai)	-
98	Thai Character Code 13 (Thai)	-
102	Thai Character Code 18 (Thai)	-

7.3. MSW2

Bit	Function	OFF/"0"	ON/"1"	Note
F				
E	(Reserved)			
D	(Reserved)			
C	180° inversion	Disabled	Enabled	*4
B				
A				
9				
8	Block print start timing	Detect Page End	Detect Line End	*3
7				
6				
5	Print speed	(See the table below.)		*1
4	Print speed	(See the table below.)		*1
3				
2	Print density	(See the table below.)		*2
1	Print density	(See the table below.)		*2
0	Print density	(See the table below.)		*2

*1) Print speed

n	MSW2-5	MSW2-4	Single-color mode
"0"	0	0	High speed
"1"	0	1	Medium speed
"2"	1	0	Low speed
"3"	1	1	(Reserved)

For the details of print speed, refer to “[Notes about general specifications] Note *1) Printing specifications <Print speed>.”

*2) Print density

n	MSW2-2	MSW2-1	MSW2-0	Print density
"0"	0	0	0	Standard
"1"	0	0	1	+ 1
"2"	0	1	0	+ 2
"3"	0	1	1	+ 3
"4"	1	0	0	Standard
"5"	1	0	1	-1
"6"	1	1	0	-2
"7"	1	1	1	-3

*3) Block print start timing

This function selects the control at the time of print start (Detect Page End, Detect Line End).

When Detect Line End is selected, printing starts immediately. However, printing can sometimes be intermittent.

Compared to Detect Page End, print quality may be poor (appearance of white lines, etc.) or the printer may make a loud noise.

If Detect Page End is selected, intermittent printing does not occur before the image buffer length (300 mm). However, compared to Detect Line End, it may take longer to start printing.

*4) 180˚ inversion

When this function is enabled and a print data length is less than 300 mm, print data is inverted by 180˚ by the following triggers.

If a print data length is 300 mm or more, the 180˚-inversion function is ignored.

If any of the following 180˚-inversion trigger commands is not sent consecutively after print data has been sent, the 180˚-inversion function is also ignored.

< 180˚-Inversion trigger commands >

- Cut command: <ESC> d n
- Form feed command: <FF>

7.4. MSW3

bit	Function	OFF/ "0"	ON/"1"	Note
F	Code page	(See the table below.)		*2
E	Code page	(See the table below.)		*2
D	Code page	(See the table below.)		*2
C	Code page	(See the table below.)		*2
B	Code page	(See the table below.)		*2
A	Code page	(See the table below.)		*2
9	Code page	(See the table below.)		*2
8	Code page	(See the table below.)		*2
7				
6				
5	Kanji characters per line	(See the table below.)		*1
4	Characters per line	(See the table below.)		*1
3				
2				
1				
0	Amount of line feed	4 mm	3 mm	

*1) Kanji characters per line/ANK characters per line

< SBCS >

MSW3-4	Character type	Character size (font + right space)	Printing width (MSW4-0 to MSW4-2)	Font-A characters per line
0	ANK	12(12+0) dot	72 mm (576 dot)	48
			51 mm (408 dot)	34
			48 mm (384 dot)	32
			50.8 mm (406 dot)	33
			34.5 mm (276 dot)	23
			32 mm (256 dot)	21
1	ANK	15(12+3) dot	72 mm (576 dot)	38
			51 mm (408 dot)	27
			48 mm (384 dot)	25
			50.8 mm (406 dot)	27
			34.5 mm (276 dot)	18
			32 mm (256 dot)	17

< Japanese Kanji character (when Japanese Kanji character is selected and MBCS is set) >

MSW3-5	Character type	Character size (left space + font + right space)	Printing width (MSW4-0 to MSW4-2)	Font-A characters per line
0	Two-byte Kanji character	26(1+24+1) dot	72 mm (576 dot)	22
			51 mm (408 dot)	15
			48 mm (384 dot)	14
			50.8 mm (406 dot)	15
			34.5 mm (276 dot)	10
			32 mm (256 dot)	9
	Single-byte Kanji character	13(0+12+1) dot	72 mm (576 dot)	44
			51 mm (408 dot)	31
			48 mm (384 dot)	29
			50.8 mm (406 dot)	31
			34.5 mm (276 dot)	21
			32 mm (256 dot)	19
1	Two-byte Kanji character	30(3+24+3) dot	72 mm (576 dot)	19
			51 mm (408 dot)	13
			48 mm (384 dot)	12
			50.8 mm (406 dot)	13
			34.5 mm (276 dot)	9
			32 mm (256 dot)	8
	Single-byte Kanji character	15(1+12+2) dot	72 mm (576 dot)	38
			51 mm (408 dot)	27
			48 mm (384 dot)	25
			50.8 mm (406 dot)	27
			34.5 mm (276 dot)	18
			32 mm (256 dot)	17

MSW3-4	Character type	Character size (font + right space)	Printing width (MSW4-0 to MSW4-2)	Font-A characters per line
0	ANK	12(12+0) dot	72 mm (576 dot)	48
			51 mm (408 dot)	34
			48 mm (384 dot)	32
			50.8 mm (406 dot)	33
			34.5 mm (276 dot)	23
			32 mm (256 dot)	21
1	ANK	15(12+3) dot	72 mm (576 dot)	38
			51 mm (408 dot)	27
			48 mm (384 dot)	25
			50.8 mm (406 dot)	27
			34.5 mm (276 dot)	18
			32 mm (256 dot)	17

< Other than Japanese Kanji character (when characters other than Japanese Kanji character are selected and MBCS is set) >

MSW3-5	Character type	Character size (left space + font + right space)	Printing width (MSW4-0 to MSW4-2)	Font-A characters per line
0	Kanji character	26(1+24+1) dot	72 mm (576 dot)	22
			51 mm (408 dot)	15
			48 mm (384 dot)	14
			50.8 mm (406 dot)	15
			34.5 mm (276 dot)	10
			32 mm (256 dot)	9
1	Kanji character	30(3+24+3) dot	72 mm (576 dot)	19
			51 mm (408 dot)	13
			48 mm (384 dot)	12
			50.8 mm (406 dot)	13
			34.5 mm (276 dot)	9
			32 mm (256 dot)	8

MSW3-4	Character type	Character size (font + right space)	Printing width (MSW4-0 to MSW4-2)	Font-A characters per line
0	ANK	13(12+1) dot	72 mm (576 dot)	44
			51 mm (408 dot)	31
			48 mm (384 dot)	29
			50.8 mm (406 dot)	31
			34.5 mm (276 dot)	21
			32 mm (256 dot)	19
1	ANK	15(12+3) dot	72 mm (576 dot)	38
			51 mm (408 dot)	27
			48 mm (384 dot)	25
			50.8 mm (406 dot)	27
			34.5 mm (276 dot)	18
			32 mm (256 dot)	17

*2) Code pages

SBCS

n	MSW3-F	MSW3-E	MSW3-D	MSW3-C	MSW3-B	MSW3-A	MSW3-9	MSW3-8	Character Table
"00"	0	0	0	0	0	0	0	0	Normal*
"01"	0	0	0	0	0	0	0	1	CodePage437 (USA,Std. Europe)
"02"	0	0	0	0	0	0	1	0	Katakana
"03"	0	0	0	0	0	0	1	1	CodePage437 (USA,Std. Europe)
"04"	0	0	0	0	0	1	0	0	Codepage 858 (Multilingual)
"05"	0	0	0	0	0	1	0	1	Codepage 852 (Latin-2)
"06"	0	0	0	0	0	1	1	0	Codepage 860 (Portuguese)
"07"	0	0	0	0	0	1	1	1	Codepage 861 (Icelandic)
"08"	0	0	0	0	1	0	0	0	Codepage 863 (Canadian
"09"	0	0	0	0	1	0	0	1	Codepage 865 (Nordic)
"0A"	0	0	0	0	1	0	1	0	Codepage 866 (Cyrillic Russian)
"0B"	0	0	0	0	1	0	1	1	Codepage 855 (Cyrillic
"0C"	0	0	0	0	1	1	0	0	Codepage 857 (Turkey)
"0D"	0	0	0	0	1	1	0	1	Codepage 862 (Israel (Hebrew)
"0E"	0	0	0	0	1	1	1	0	Codepage 864 (Arabic)
"0F"	0	0	0	0	1	1	1	1	Codepage 737 (Greek)
"10"	0	0	0	1	0	0	0	0	Codepage 851 (Greek)
"11"	0	0	0	1	0	0	0	1	Codepage 869 (Greek)
"12"	0	0	0	1	0	0	1	0	Codepage 928 (Greek)
"13"	0	0	0	1	0	0	1	1	Codepage 772 (Lithuanian)
"14"	0	0	0	1	0	1	0	0	Codepage 774 (Lithuanian)
"15"	0	0	0	1	0	1	0	1	Codepage 874 (Thai)
"20"	0	0	1	0	0	0	0	0	Codepage 1252 (Windows Latin-
"21"	0	0	1	0	0	0	0	1	Codepage 1250 (Windows Latin-
"22"	0	0	1	0	0	0	1	0	Codepage 1251 (Windows
"40"	0	1	0	0	0	0	0	0	Codepage 3840 (IBM-Russian)
"41"	0	1	0	0	0	0	0	1	Codepage 3841 (Gost)
"42"	0	1	0	0	0	0	1	0	Codepage 3843 (Polish)
"43"	0	1	0	0	0	0	1	1	Codepage 3844 (CS2)
"44"	0	1	0	0	0	1	0	0	Codepage 3845 (Hungarian)
"45"	0	1	0	0	0	1	0	1	Codepage 3846 (Turkish)
"46"	0	1	0	0	0	1	1	0	Codepage 3847 (Brazil-ABNT)
"47"	0	1	0	0	0	1	1	1	Codepage 3848 (Brazil-
"48"	0	1	0	0	1	0	0	0	Codepage 1001 (Arabic)
"49"	0	1	0	0	1	0	0	1	Codepage 2001 (Lithuanian-
"4A"	0	1	0	0	1	0	1	0	Codepage 3001 (Estonian-1)
"4B"	0	1	0	0	1	0	1	1	Codepage 3002 (Estonian-2)
"4C"	0	1	0	0	1	1	0	0	Codepage 3011 (Latvian-1)
"4D"	0	1	0	0	1	1	0	1	Codepage 3012 (Latvian-2)
"4E"	0	1	0	0	1	1	1	0	Codepage 3021 (Bulgarian)
"4F"	0	1	0	0	1	1	1	1	Codepage 3041 (Maltese)
"60"	0	1	1	0	0	0	0	0	Thai Character Code 42 (Thai)
"61"	0	1	1	0	0	0	0	1	Thai Character Code 11 (Thai)
"62"	0	1	1	0	0	0	1	0	Thai Character Code 13 (Thai)
"66"	0	1	1	0	0	1	1	0	Thai Character Code 18 (Thai)
"80"	1	0	0	0	0	0	0	0	UTF-8
"FF"	1	1	1	1	1	1	1	1	User Setting (Blank code page)

MBCS (UTF-8)

n	MSW3-F	MSW3-E	MSW3-D	MSW3-C	MSW3-B	MSW3-A	MSW3-9	MSW3-8	UTF-8
Other than “80”	*	*	*	*	*	*	*	*	UTF-8 disabled (*1)
"80"	1	0	0	0	0	0	0	0	UTF-8 enabled (*2)

*1) When UTF-8 is disabled, Kanji character code is defined in JIS/Shift JIS/GB/BIG5/KS code.

*2) When UTF-8 is enabled, Kanji character code is defined in UTF-8.
Kanji characters that can be printed in UTF-8 are only those types set in “MSW0: Multi-byte character.”

7.5. MSW4

bit	Function	OFF/"0"	ON/"1"	Note
F				
E				
D				
C				
B				
A				
9				
8				
7				
6				
5				
4				
3				
2	Printing width	(See the table below.)		*1
1	Printing width	(See the table below.)		*1
0	Printing width	(See the table below.)		*1

*1) Printing widths

n	MSW4-2	MSW4-1	MSW4-0	Printing width
"0"	0	0	0	72 mm (576 dot)
"1"	0	0	1	51 mm (408 dot)
"2"	0	1	0	48 mm (384 dot)
"3"	0	1	1	50.8 mm (406 dot)
"4"	1	0	0	(Reserved)
"5"	1	0	1	34.5 mm (276 dot)
"6"	1	1	0	32 mm (256 dot)
"7"	1	1	1	(Reserved)

7.6. MSW7

bit	Function	OFF/"0"	ON/"1"	Note
F	ASB (Ethernet)	Enabled	Disabled	*2
E				
D				
C	ASB (USB-C)	Enabled	Disabled	*2
B	NSB (Ethernet)	Enabled	Disabled	*1
A				
9				
8	NSB (USB-C)	Enabled	Disabled	*1
7				
6				
5				
4				
3				
2				
1				
0	Error sound playback function	Disabled	Enabled	*3

*1) NSB

When the USB-C I/F is used, this function automatically sends printer status at every BULK IN transaction.
When the Ethernet I/F is used, this function automatically sends printer status when the print port (TCP #9100) is connected.
This function does not support the USB-A I/F (fixed to disabled).

*2) ASB

This function automatically sends printer status to the host every time printer status changes.

*3) Error sound playback function

This function is applied when the melody speaker is connected.
For the details of the error sound playback function, refer to the MCS10 product specifications.

7.7. MSW8

bit	Function	OFF/"0"	ON/"1"	Note
F	Horizontal reduced printing	(See the table below.)		*1
E	Horizontal reduced printing	(See the table below.)		*1
D	Horizontal reduced printing	(See the table below.)		*1
C	Horizontal reduced printing	(See the table below.)		*1
B				
A				
9	Vertical reduced printing	(See the table below.)		*2
8	Vertical reduced printing	(See the table below.)		*2
7	Barcode reduced printing	Reduced	Not reduced	*3
6				
5				
4				
3	Horizontal paper saving	Disabled	Enabled	*4
2	Vertical paper saving	Disabled	Enabled	*5
1				
0				

*1) Horizontal reduced printing

n	MSW8-F	MSW8-E	MSW8-D	MSW8-C	Horizontal reduced printing
"0"	0	0	0	0	Disabled
"1"	0	0	0	1	Enabled (67%)
"2"	0	0	1	0	
...	...	...	...	...	
"F"	1	1	1	1	

When the horizontal reduced printing function is enabled, data with a printing width of 72 mm is printed based on the above reduction ratio, according to the current printing width setting (MSW4-0 to 2).

*2) Vertical reduced printing

n	MSW8-9	MSW8-8	Vertical reduced printing
"0"	0	0	Disabled
"1"	0	1	Enabled (50%)
"2"	1	0	Enabled (75%)

*3) Barcode reduced printing

This function is applied when the reduced printing function is enabled.

Restriction when the barcode reduced printing function is disabled

- Characters or bit images that run in the vertical direction of a barcode are not printed in reduced size.

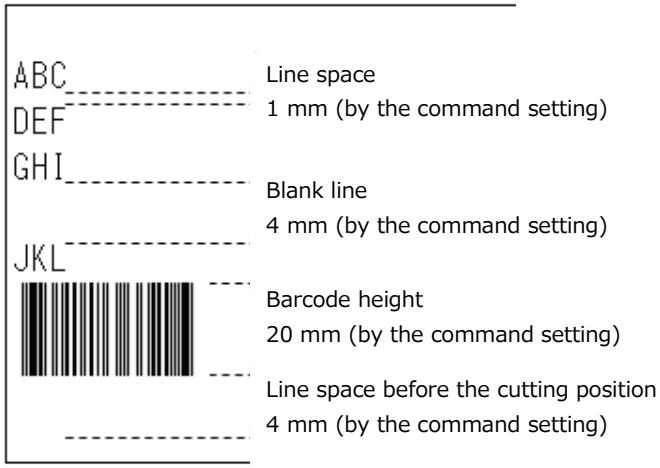
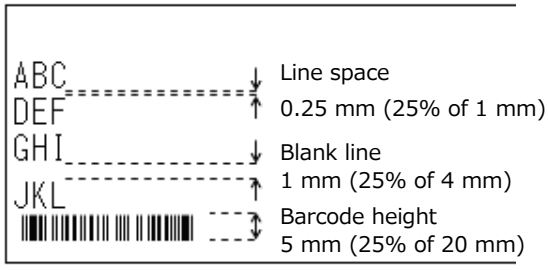
*4) Horizontal paper saving

When enabled, Font-A is automatically replaced with Font-B.

*5) Vertical paper saving

When enabled, the line space is reduced to 25% of the original size, the height of blank lines to 25%, the barcode height to 25%, and the height of the blank line immediately before the cut command to 0%. If the line space is reduced to less than 2 dots (0.25 mm) by this setting, the line space is set to 2 dots. If the barcode height is reduced to less than 30 dots (3.75 mm) by this setting, the barcode height is set to 30 dots.

This setting is disabled in page mode.

	Printing result
Vertical paper saving disabled	
Vertical paper saving enabled	

7.8. MSWA

bit	Function	OFF/"0"	ON/"1"	Note
F	Hold print timeout	(See the table below.)		*4
E	Hold print timeout	(See the table below.)		*4
D	Hold print timeout	(See the table below.)		*4
C	Hold print notification	Disabled	Enabled	*3
B				
A				
9				
8				
7				
6				
5				
4				
3				
2				
1	Hold print status	Enabled	Disabled	*2
0	Hold print control	Enabled	Disabled	*1

*1) Hold print control

When enabled, the next printing is put on hold inside the printer until the ejected paper is removed.

*2) Hold print status

When enabled, the status of the hold print sensor is applied to the status.

With the application that controls this product, processing such as stopping the next print command can be performed according to the hold print status.

*3) Hold print notification

When enabled, the buzzer is activated 5 seconds after paper cutting and it sounds periodically until the printed paper is removed or until the specified hold print timeout time elapses.

*4) Hold print timeout

When the time has elapsed, printing is put on hold by the hold print control.

n	MSWA-F	MSWA-E	MSWA-D	Timeout time
"0"	0	0	0	Disabled
"1"	0	0	1	5 minutes
"2"	0	1	0	10 minutes
"3"	0	1	1	30 minutes
"4"	1	0	0	Disabled
...	...	...	...	Disabled
"F"	1	1	1	Disabled

7.9. MSWB

bit	Function	OFF/"0"	ON/"1"	Note
F				
E	Communication connection status	Enabled	Disabled	*1
D				
C	Print data processing after	Print data is discarded.	Reprinted	*2
B				
A				
9				
8				
7				
6				
5				
4				
3				
2				
1				
0				

*1) Communication connection status detection

If this function is enabled, the communication connection status of the interface is monitored.
If a disconnection is detected when a command is being received, the command analysis will be terminated.
If data cancel mode is enabled when a disconnection is detected, data cancellation will be performed until the document end command.

*2) Print data processing after recovery from an error

This function is only enabled in page mode.

MSWB-C = 0 (Print data is discarded.)	MSWB-C = 1 (Reprinted)
When an error occurs, the subsequent print data is discarded.	When ON-LINE is recovered, printing is resumed from the top of the page at the time of the error.

7.10. MSWC

bit	Function	OFF/"0"	ON/"1"	Note
F				
E				
D				
C				
B				
A				
9				
8				
7				
6				
5				
4				
3	(Reserved)			
2	(Reserved)			
1	USB serial number	Disabled	Enabled	
0				

7.11. MSWE

bit	Function	OFF/"0"	ON/"1"	Note
F				
E				
D				
C				
B	I/F switching wait time	(See the table below.)		*1
A	I/F switching wait time	(See the table below.)		*1
9	I/F switching wait time	(See the table below.)		*1
8	I/F switching wait time	(See the table below.)		*1
7				
6				
5				
4				
3				
2				
1				
0				

*1) I/F switching wait time

n	MSWE-B	MSWE-A	MSWE-9	MSWE-8	I/F switching wait time
"0"	0	0	0	0	3 seconds
"1"	0	0	0	1	1 second
"2"	0	0	1	0	2 seconds
"3"	0	0	1	1	3 seconds
"4"	0	1	0	0	4 seconds
"5"	0	1	0	1	5 seconds
"6"	0	1	1	0	6 seconds
"7"	0	1	1	1	7 seconds
"8"	1	0	0	0	8 seconds
"9"	1	0	0	1	9 seconds
"A"	1	0	1	0	10 seconds
"B"	1	0	1	1	(Reserved)
"C"	1	1	0	0	(Reserved)
"D"	1	1	1	0	(Reserved)
"E"	1	1	1	1	(Reserved)
"F"	1	1	1	1	(Reserved)

7.12. MSWF

bit	Function	OFF/"0"	ON/"1"	Note
F				
E				
D				
C				
B				
A				
9	Paper feed with the feed button	Enabled	Disabled	
8	Cutter operation	Enabled	Disabled	
7				
6				
5				
4				
3				
2				
1				
0				

7.13. MSWR

bit	Function	OFF/"0"	ON/"1"	Note
F				
E				
D				
C				
B	Top margin setting	(See the table below.)		*1
A	Top margin setting	(See the table below.)		*1
9	Top margin setting	(See the table below.)		*1
8	Top margin setting	(See the table below.)		*1
7				
6				
5				
4				
3				
2				
1	(Reserved)			
0	(Reserved)			

*1) Top margin settings

n	MSWR-B	MSWR-A	MSWR-9	MSWR-8	Top margin
"0"	0	0	0	0	11 mm (Back feed disabled)
"1"	0	0	0	1	(Reserved)
"2"	0	0	1	0	(Reserved)
"3"	0	0	1	1	(Reserved)
"4"	0	1	0	0	(Reserved)
"5"	0	1	0	1	5 mm (Back feed enabled)
"6"	0	1	1	0	(Reserved)
"7"	0	1	1	1	(Reserved)
"8"	1	0	0	0	(Reserved)
"9"	1	0	0	1	(Reserved)
"A"	1	0	1	0	(Reserved)
"B"	1	0	1	1	11 mm
"C"	1	1	0	0	(Reserved)
"D"	1	1	0	1	(Reserved)
"E"	1	1	1	0	(Reserved)
"F"	1	1	1	1	(Reserved)

8. Application development

The following is information on the development of applications to control this product.

8.1. Supported emulations

StarPRNT emulation

8.2. Software

l Development kits l

Name	Outline
StarXpand SDK for iOS/Android	A development kit for controlling the printer from the native application. A revamped version of StarPRNT iOS SDK. Manual: https://www.star-m.jp/starxpandsdk-oml.html
StarXpand SDK for ReactNative	A development kit for controlling the printer from the native application using ReactNative. Manual: https://www.star-m.jp/react-native-stario10-oml.html
StarPRNT SDK	A development kit for controlling the printer from the native application. Manual: https://www.star-m.jp/starprntsdk-oml-android.html
Star Micronics Cloud Services	A service that provides access to printer data by connecting the Star Micronics printer to the Star Micronics cloud. Manual: https://www.starmicronicscloud.com
StarwebPRNT SDK	A development kit for performing printing from various devices such as PC and tablet via the Web browser. Manual: https://www.star-m.jp/starwebprnt-oml.html
Star PassPRNT SDK	A development kit for performing call printing from other applications by the URL scheme. Printing can be performed with the Star Micronics printer by receiving print data. Manual: https://www.star-m.jp/starpassprntsdk-oml-android.html
Star CloudPRNT SDK	Star CloudPRNT is a protocol that enables printing from remote servers. Manual: https://www.star-m.jp/starcloudprntsdk-oml.html

l Drivers l

Name	Outline	Operating environment
Star Windows Driver	This is required when using the Star Micronics printer via the Windows printer driver. Use the Windows printer driver to perform printing from Windows applications. It is included in Star Windows Software.	Windows
Star OPOS Driver	This is required when using the Star Micronics printer and peripherals via the OPOS driver. It is included in Star Windows Software.	Windows
Star JavaPOS Driver	This is required when using the Star Micronics printer and peripherals via the JavaPOS driver.	Windows, Linux, macOS
Star CUPS Driver	This is required when using the Star Micronics printer and peripherals via the CUPS driver.	Linux, macOS

l Utilities l

Name	Outline	Operating environment
Star Quick Setup Utility	This enables communication setting, initial setting, printer behavior check, and printer setting change.	iOS, Android
Star Windows Software	This provides the Windows printer driver, the OPOS driver, and printer utilities. Printer utilities enable various settings of the printer. The following are covered: Installation of printer driver, setting of OPOS driver, setting utilities, SteadyLAN setting utility, and USB serial number setting utility.	Windows

l Download l

Download software and manuals from the following URL:

https://www.star-m.jp/supportsite-wsw.html

9. Related regulations

9.1. Electrical safety, EMC

Country	Electrical safety	EMC
International standard	CB	-
USA	UL	FCC (EMI Class A)
Canada	c-UL	ICES-003 (EMI Class A)
Europe	CE, UKCA (EMI Class A)	
Mexico	UL CoC	-
Australia / New Zealand	-	RCM (EMI Class A)
Japan	-	VCCI (EMI Class A)

9.2. Radio

N/A

9.3. Environment

Country	Environment
Europe	CE, UKCA (RoHS Directive) WEEE Directive Packaging and Package Waste Directive REACH Regulation

9.4. Energy Star

Energy Star Program compliant

10. Appendix

10.1. Example of ARP/Ping execution

Assumption: MAC address of printer = 00:11:62:12:34:56, Temporary IP address to set = 192.168.10.2

1. Turn on the power.
   Wait until the printer is ready to receive ARP/Ping (usually, about 25 seconds).
   Alternatively, execute self-printing and wait until the following is printed:

```
**************************************
     Current IP Parameters Status
**************************************
 IP Address       :0.0.0.0 (Didn't obtain)
 Subnet Mask      :0.0.0.0
 Default Gateway  :0.0.0.0
```

2. Execute the command prompt as an administrator to start up.

3. To avoid address duplication, clear the existing ARP table on the host device from the command line.

```
arp -d 192.168.10.2
arp –a
```

4. Register the combination of IP address and MAC address to the ARP table on the host device.
   (Linux/Mac) Shell

```
arp -s 192.168.10.2 00:11:62:12:34:56
arp –a
```

   (Windows) Command prompt

```
arp -s 192.168.10.2 00-11-62-12-34-56
arp –a
```

5. Run ping from the host device.

```
ping 192.168.10.2
```

6. Check that an echo response is returned from the NIC through the specified address.
   Note that the initial echo response is not returned since it is used to retrieve the IP address.
   Response is returned for the second ping and later.

```
ping 192.168.10.2
 → No response (timeout)
ping 192.168.10.2
 → echo response
ping 192.168.10.2
 → echo response
ping 192.168.10.2
 → echo response
```

7. Lastly, delete the ARP table registered in (4).
   Be sure to carry out this operation to avoid address duplication.

```
arp -d 192.168.10.2
arp –a
```

10.2. Example procedures for registering SSL/TLS certificates

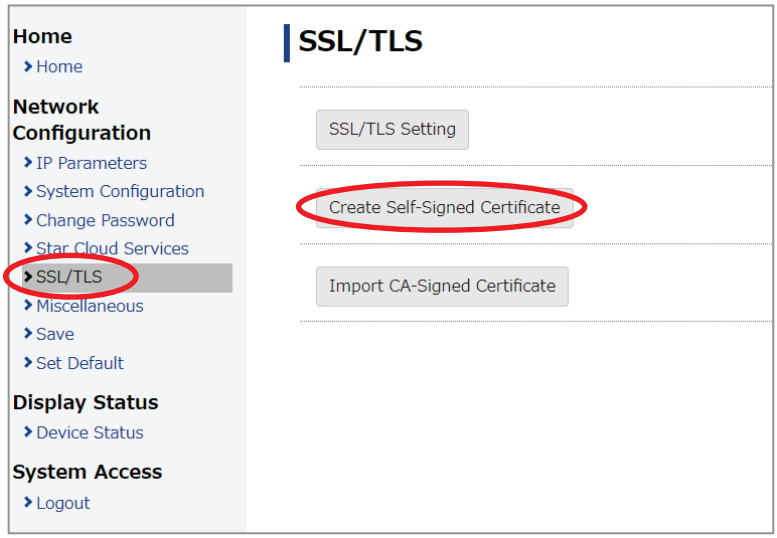
To use SSL/TLS communication (HTTPS), you must configure settings for the use of either a self-signed certificate or CA-signed certificate. The following shows procedures.

10.2.1. Using a self-signed certificate

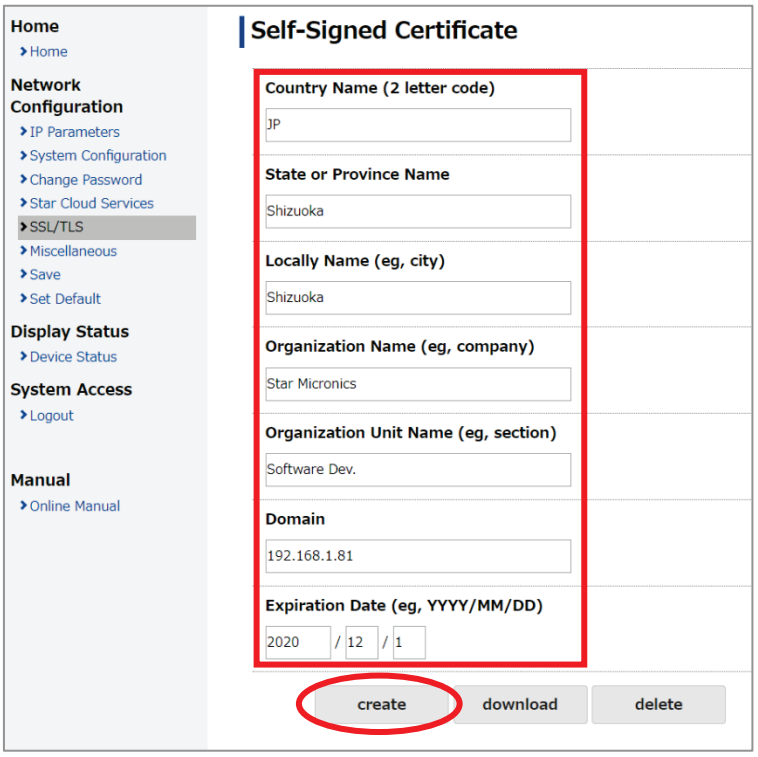
1. Create a certificate with the printer.
   Access the printer's IP address (in this example, http://192.168.1.81) from the browser, and then log in with root privileges.

   Enter the Username, "root," the password, "public" (factory setting), and then click [Sign in].

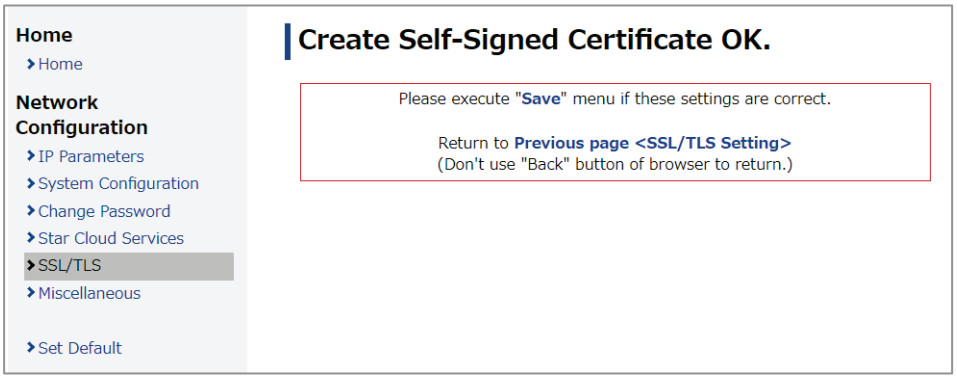
   Select "SSL/TLS," and click [Create Self-Signed Certificate].



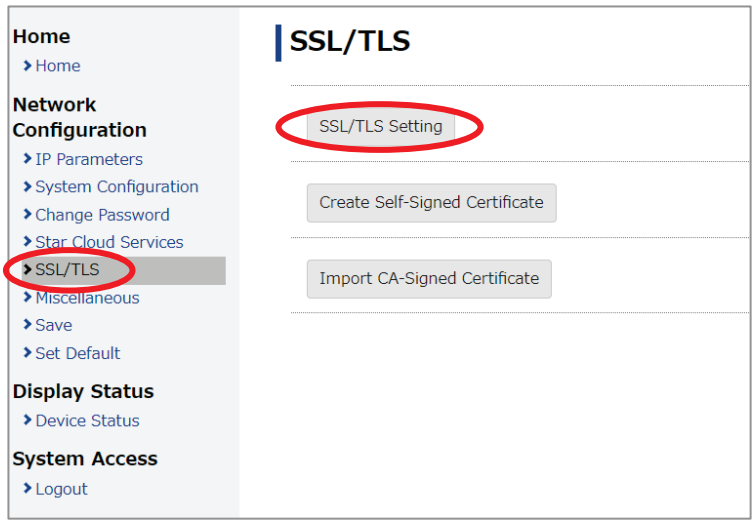
In “Self-Signed Certificate,” fill in each field, and click [Create] to create a certificate in the printer.
In Domain, enter the IP address of this product (static value). * The following screen shows entry examples.



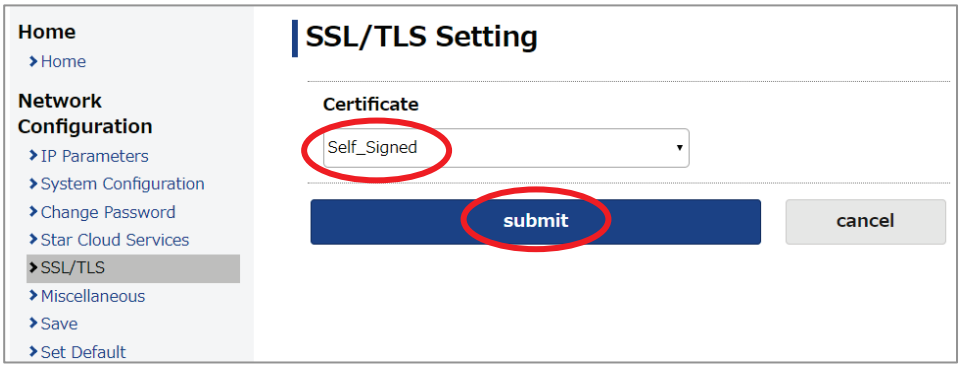
The following screen appears when a certificate is successfully created.



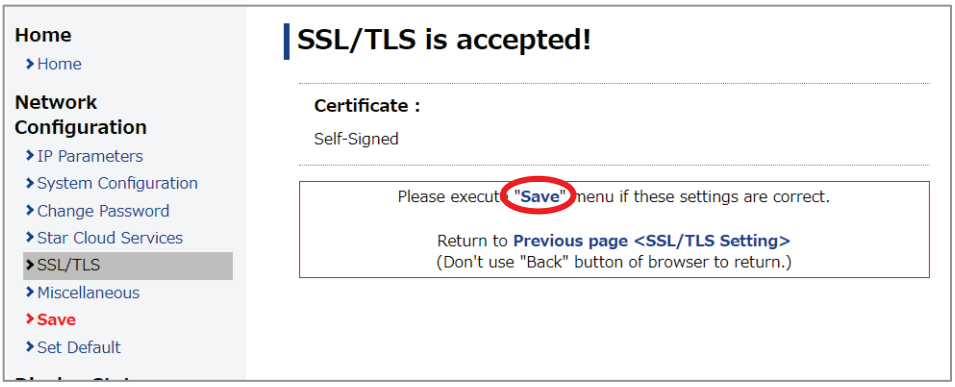
2. Enable the printer’s self-signed certificate setting.
Select “SSL/TLS,” and click [SSL/TLS Setting].



In “Certificate,” select “Self-Signed” and click [submit].



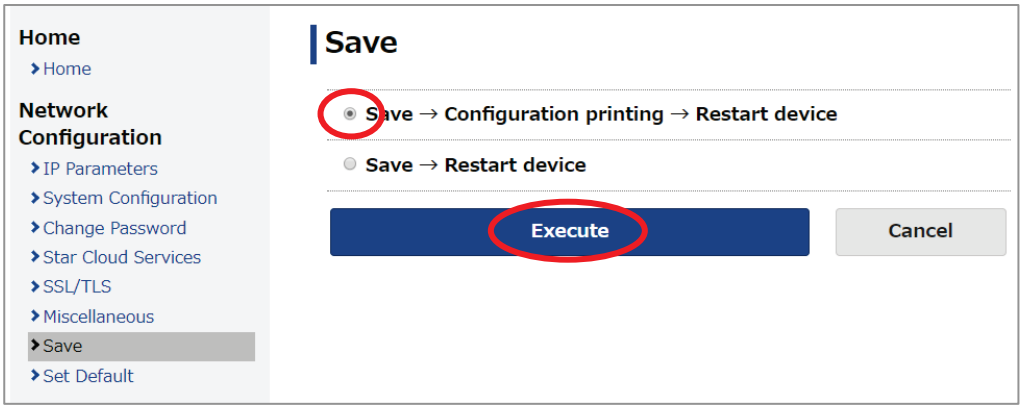
The following is displayed. Check that Certificate: shows Self-Signed.



Select “Save.”

In the Save screen, select “Save → Configuration printing → Restart device” and click [Execute].
The printer outputs the settings. Check that the settings are as shown below:

- Self-signed Certificate: Exist
- Certificate: Self-Signed

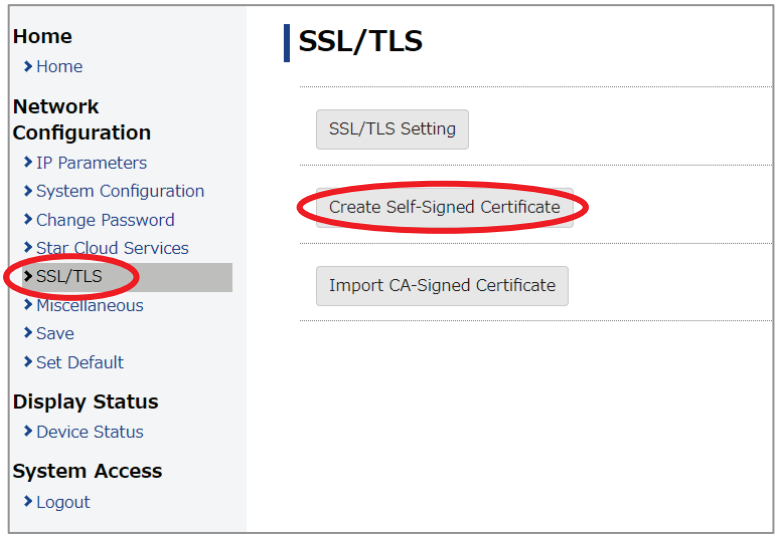


The printer’s self-signed certificate has been successfully created.

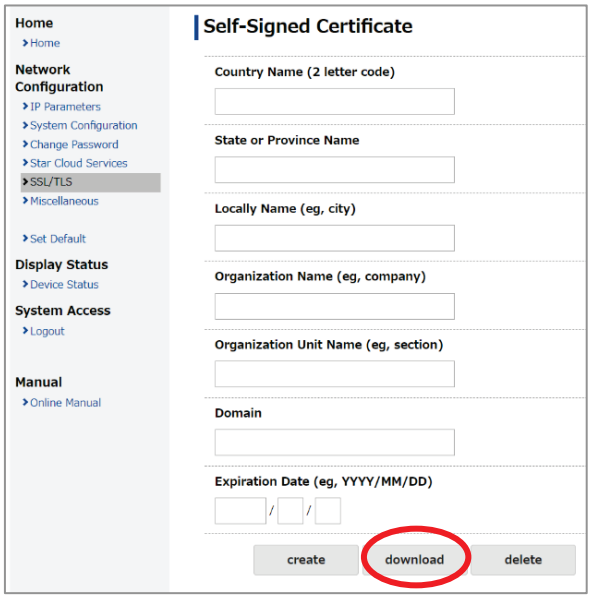
3. Import the certificate to the browser.
   Import the certificate created in the NIC to the browser of the client device.

■ Windows device (Windows 7)

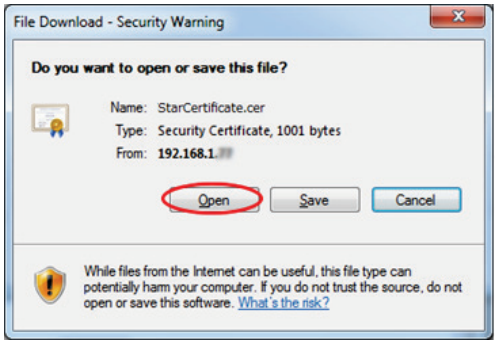
Select “SSL/TLS,” and click [Create Self-Signed Certificate].



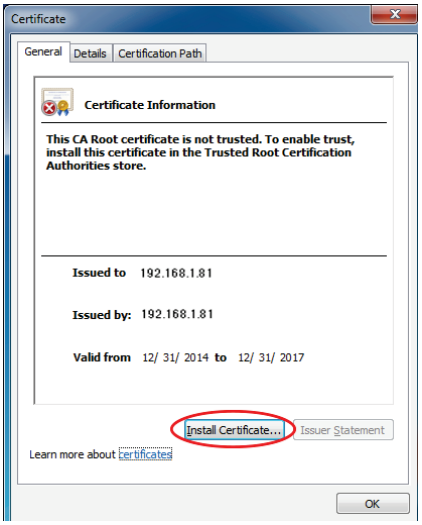
Click [download] and save the certificate file (with an optional name) in any place of Windows.
(In this example, it is saved with a name “StarCertificate.cer.”



On the client device, double click the saved certificate file and click [Open].

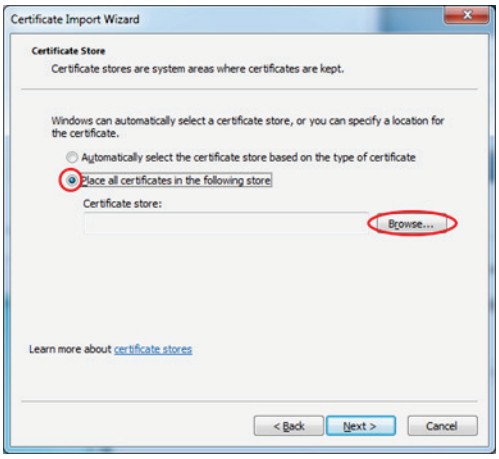


Click [Install Certificate].

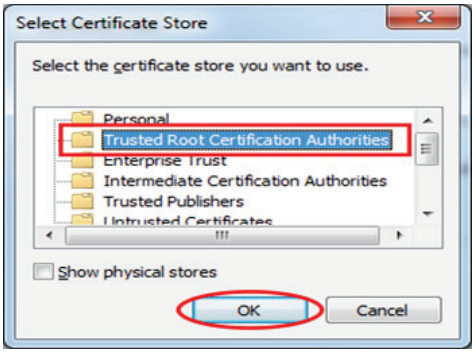


Click [Next].

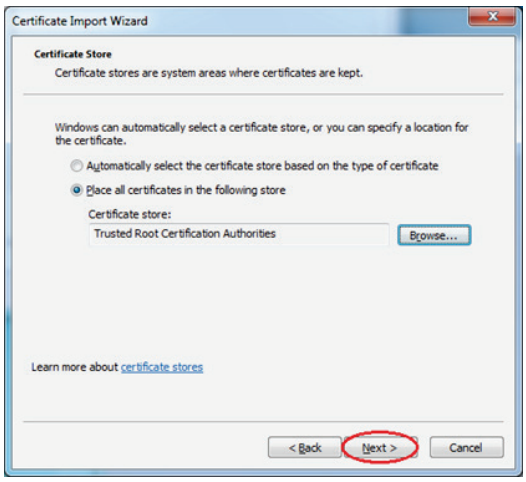
Select “Place all certificates in the following store,” and click [Browse].



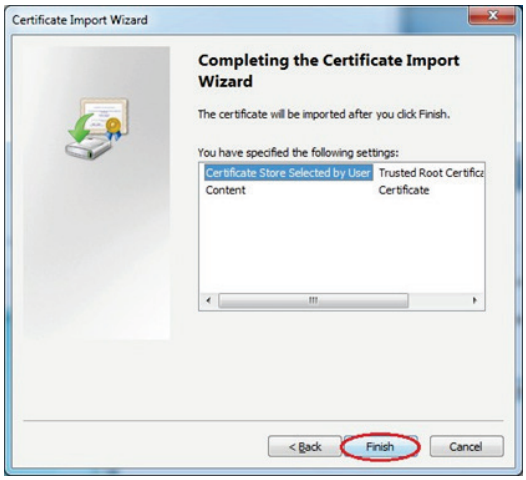
Select “Trusted Root Certification Authorities,” and click [OK].



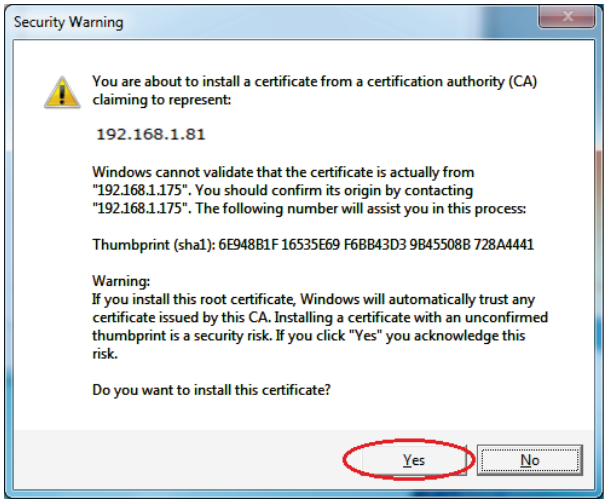
Click [Next].



Click [Finish].

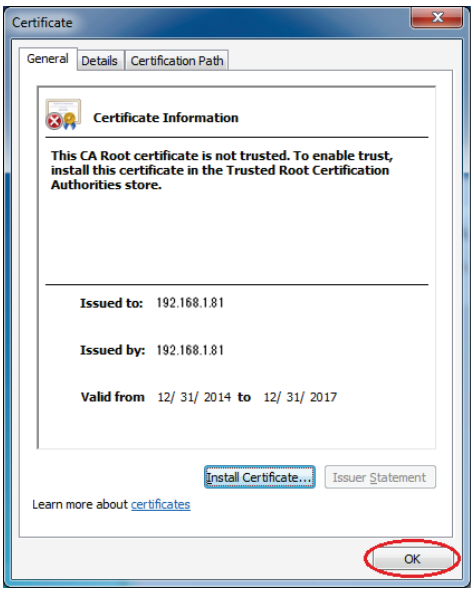


When the following message appears, click [Yes].

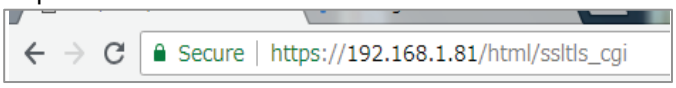


Click [OK].

Click [OK] to exit. The procedure is complete.



Turn on the printer again. You can access the web screen of the printer through the address beginning with “https://.”



Note that depending on the environment of client devices, you may need to add the address to “Trusted sites.”
(Combination of Windows 10 and Microsoft Edge, etc.)
→ Refer to “10.2.3 Supplementary information.”

[References]

When importing a certificate file to the browser on Windows 8/8.1/10/11, open Certificate Manager “certmgr.msc” in Windows Administrative Tools, and then perform the following procedure.

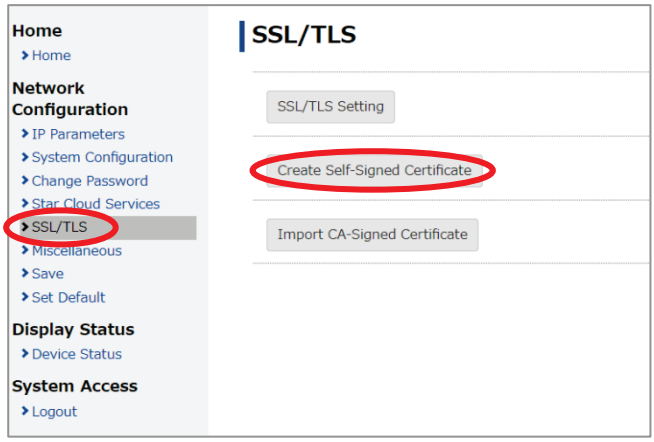
1. Select “Trusted Root Certification Authorities” → “Certificates.”
2. From the “Operation” menu, select “All tasks” → “Import.”
3. Import a self-singed certificate in accordance with the Certificate Import Wizard.

- Confirm that the certificate has been imported by checking “Trusted Root Certification Authorities” → “Certificate.”

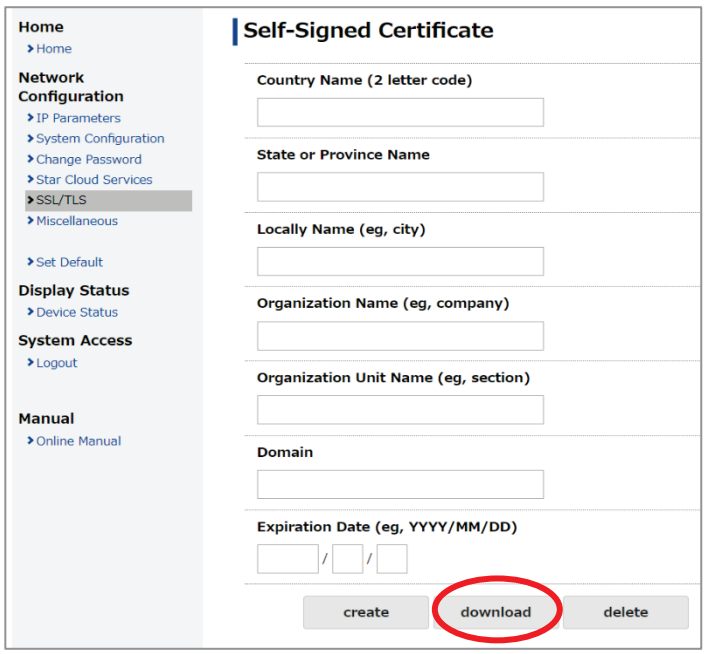
■ iOS device

Start the browser (Safari) to access the printer's IP address (in this example, http://192.168.192.63), and log in with root privileges. Select "SSL/TLS" and then "Create Self-Signed Certificate."

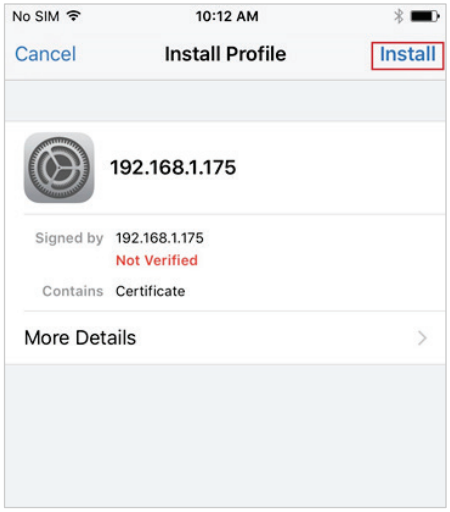
<Note> For iOS devices, Safari must be used because it is the only browser that allows downloading certificates.



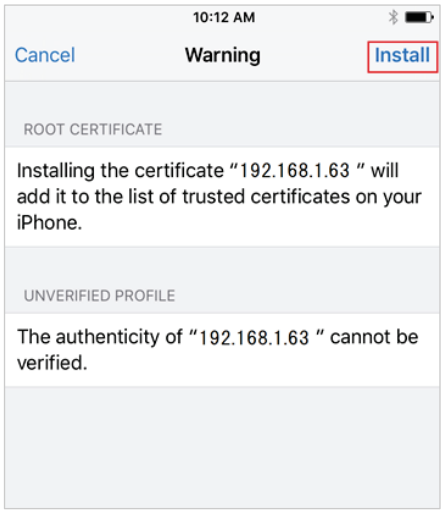
Click [download].



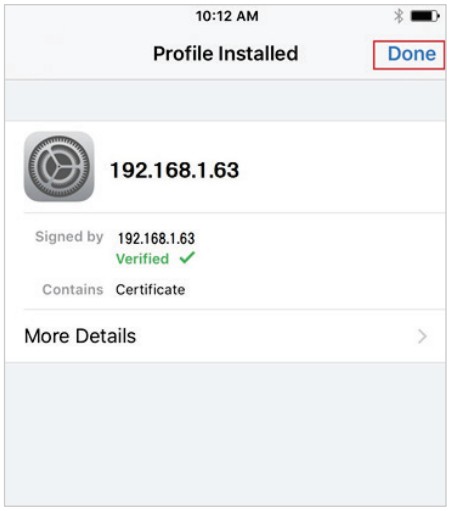
When the following screen appears, select [Install].



When the following screen appears, select [Install].



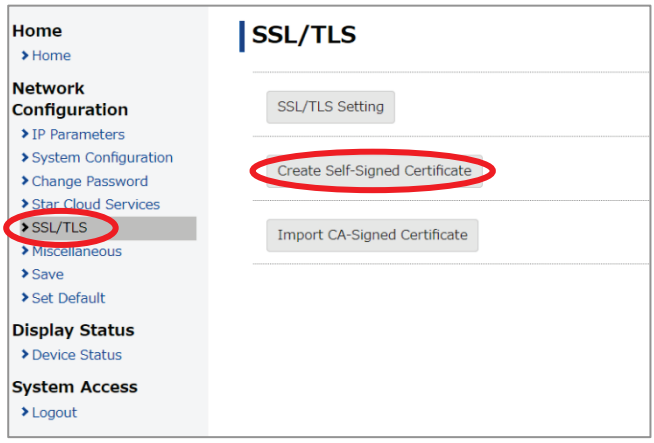
When the following screen appears, the installation is complete. Click [Done] to exit.



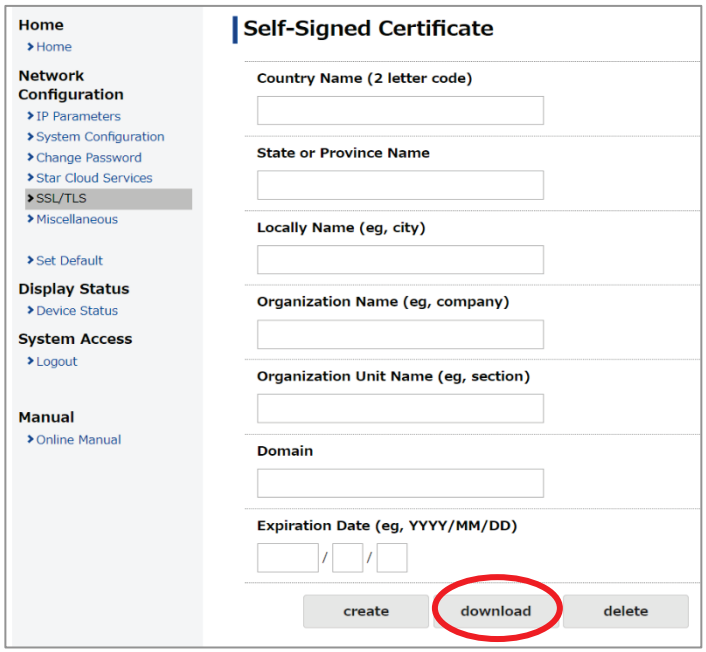
Turn on the printer again. You can access the web screen of the printer through the address beginning with "https://." If you use the iOS 10.3 or later, you need to configure the iOS additionally. Also refer to "10.2.4. Setup required for the certificate registration with iOS 10.3 or later."

■Android

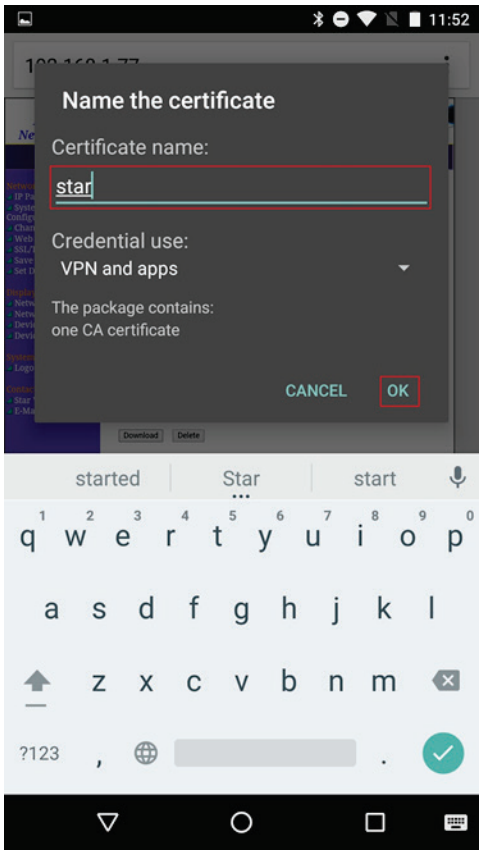
Start the browser (Chrome) to access the printer's IP address (in this example, http://192.168.192.63), and log in with root privileges. Select [SSL/TLS] and click [Create Self-Signed Certificate].



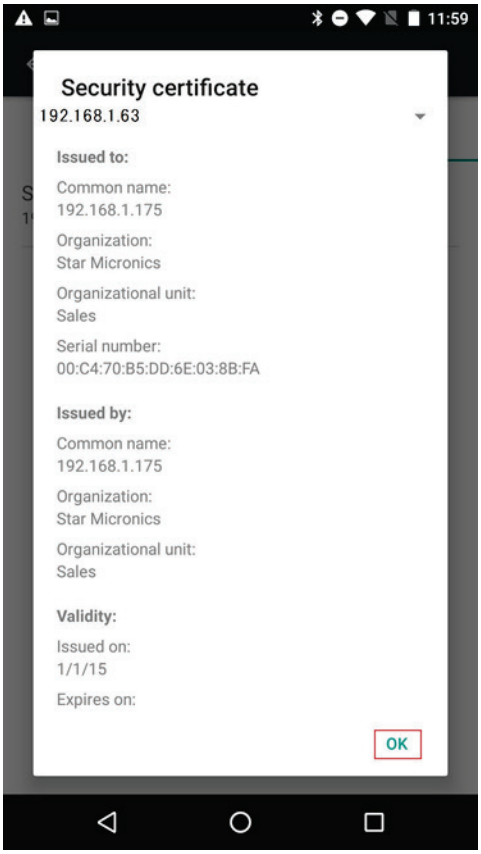
Click [download].



When you are prompted to enter the name of the certificate, enter any name (in this example, “star”), and click [OK].



When the details of the certificate appear, the installation is complete. Click [OK] to exit.



Turn on the printer again. You can access the web screen of the printer through the address beginning with “https://.”

10.2.2. Using a CA-signed certificate

Import the server certificate created externally and signed by a CA (certification authority) and the private key to the printer.

In the browser, you must register the CA (certification authority) as “Trusted Root Certification Authorities.”

1. Prepare the server certificate and the private key.

   Prepare the files of the server certificate signed by an external certification authority (CA) and the private key that meet the following requirements.

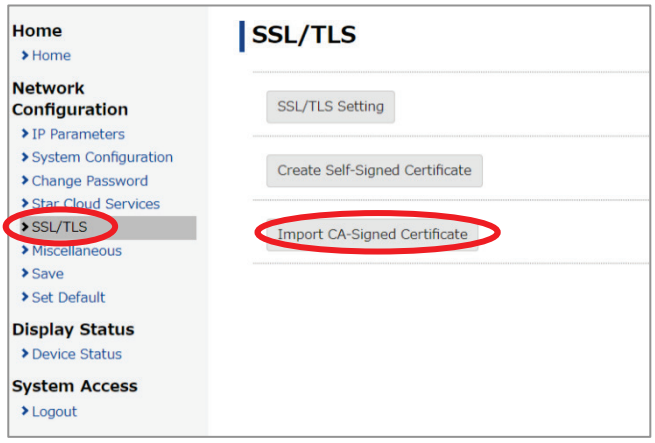
   - Encoding type: Base64 (file extension: PEM)
   - Certificate file type: PKCS #1
   - Key length: RSA 2048 bits or 1024 bits

2. Import the server certificate and the private key to the NIC.

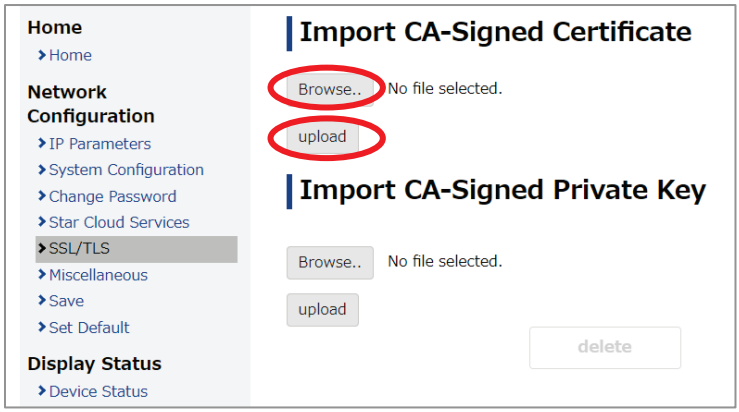
   Access the printer’s IP address (in this example, http://192.168.1.81) from the browser, and then log in with root privileges.

   Enter the Username, “root,” the password, “public” (factory setting), and then click [Sign in].

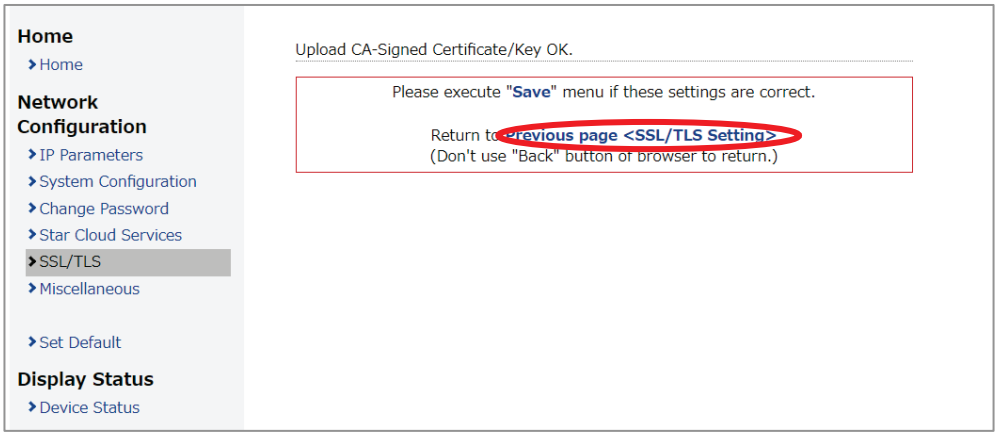
Click “SSL/TLS.”
Click [Import CA-Signed Certificate].



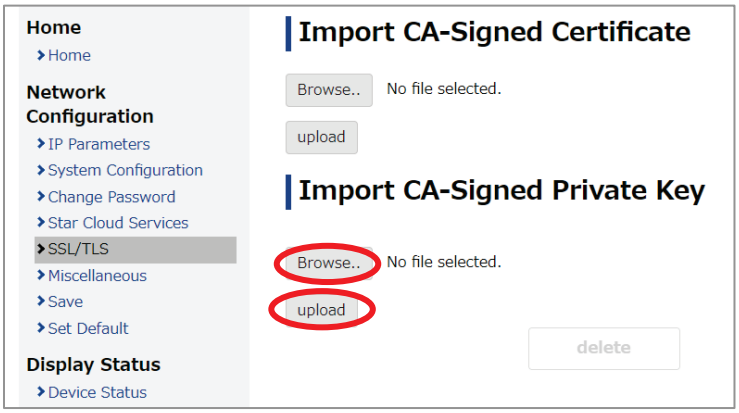
Click [Browse] in the “Import CA-Signed Certificate” section. Select the certificate file to import, from the client device’s file dialog, and then click [upload].



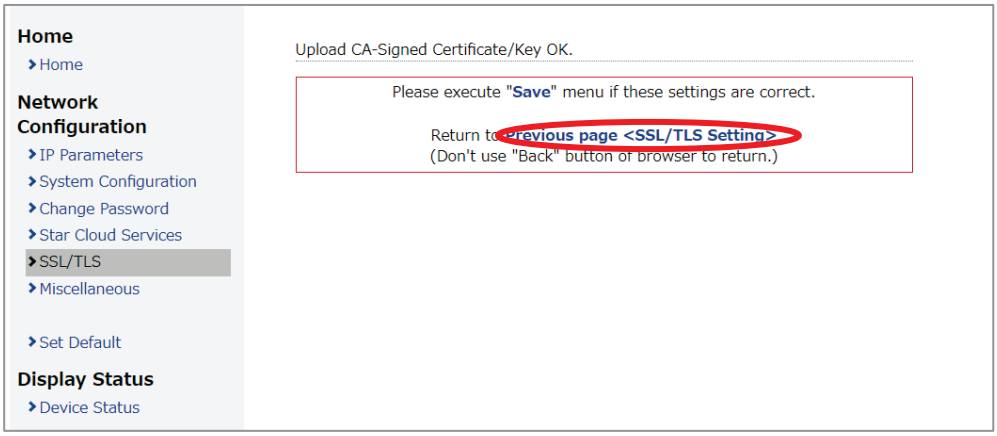
The following screen appears when the file has been successfully imported.
Click Return to Previous page to return to the previous page, and register the private key next.



Click [Browse] in the Import CA-Signed Private Key section. Select the private key file from the client device's file dialog, and then click [upload].

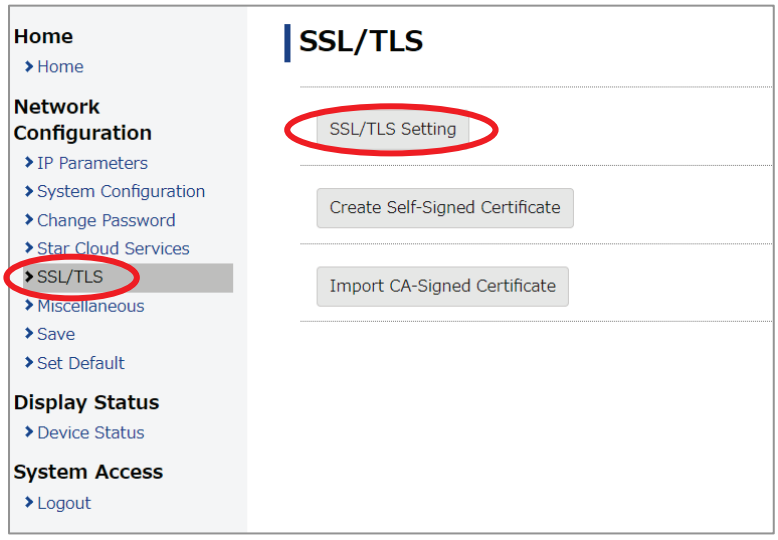


The following screen appears when the file has been successfully imported.

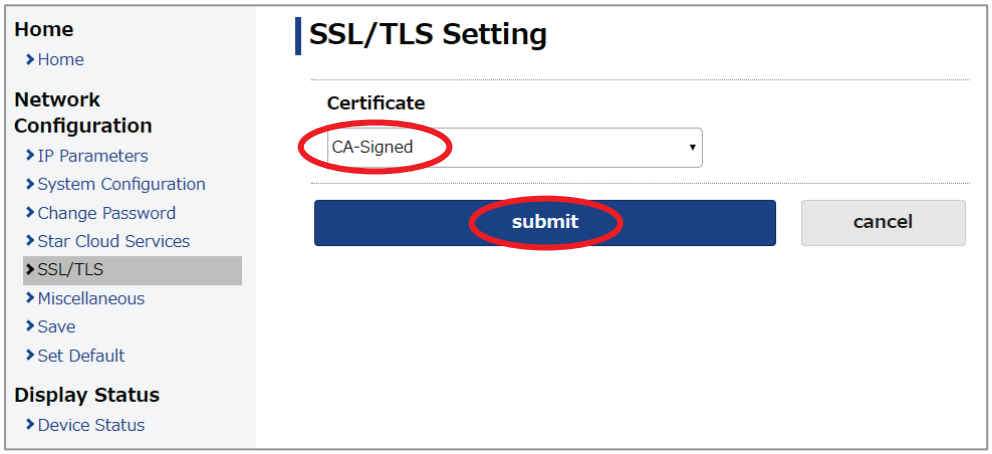


The registration is complete.

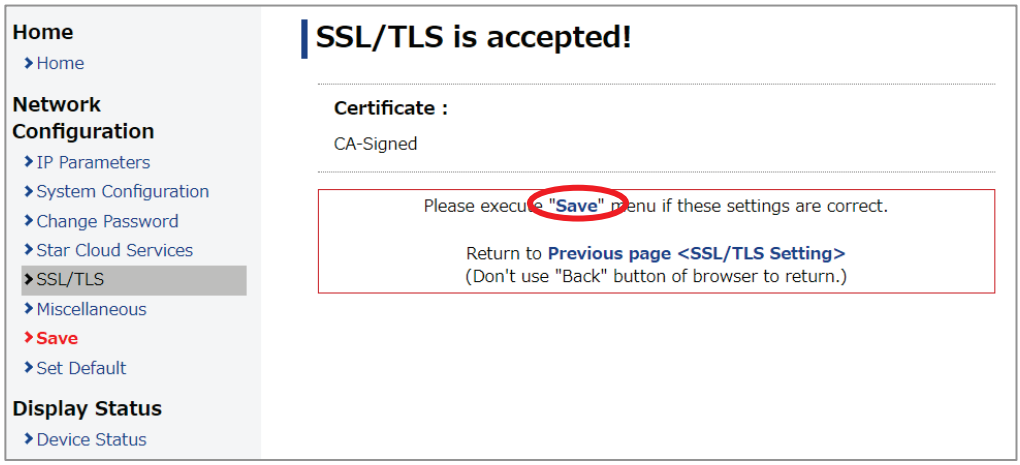
3. Enable the CA-signed certificate setting.
   Click “SSL/TLS.”
   Click [SSL/TLS Setting].



In “Certificate,” select “CA-Signed” and click [submit].

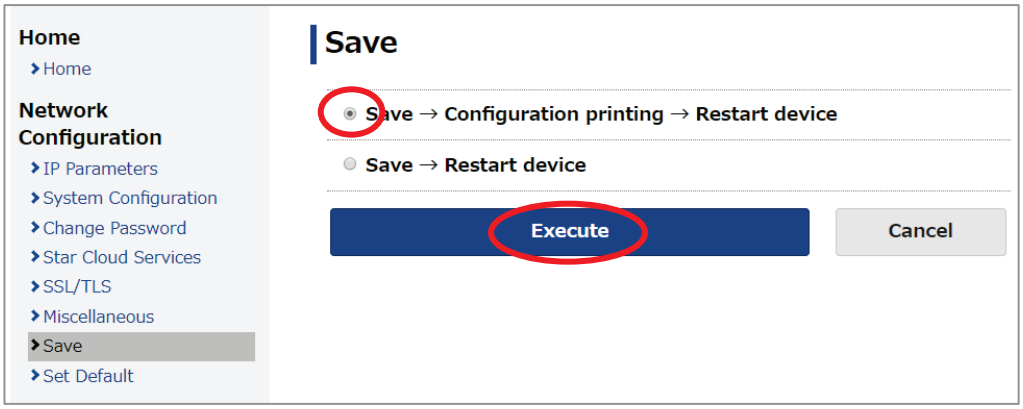


The following is displayed. Check that Certificate: shows CA-Signed.



Click “Save.” In the Save screen, select “Save → Configuration printing → Restart device.”
Click [Execute].
The printer outputs the settings. Check that the settings are as shown below:

- CA-Signed Certificate: Exist
- Certificate: CA-Signed



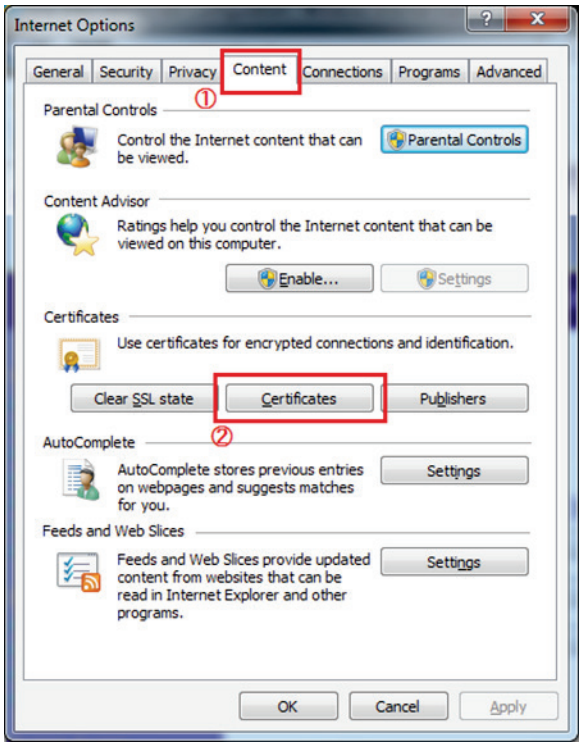
The server certificate and the private key have been successfully imported to the NIC.

[Registration to browser]

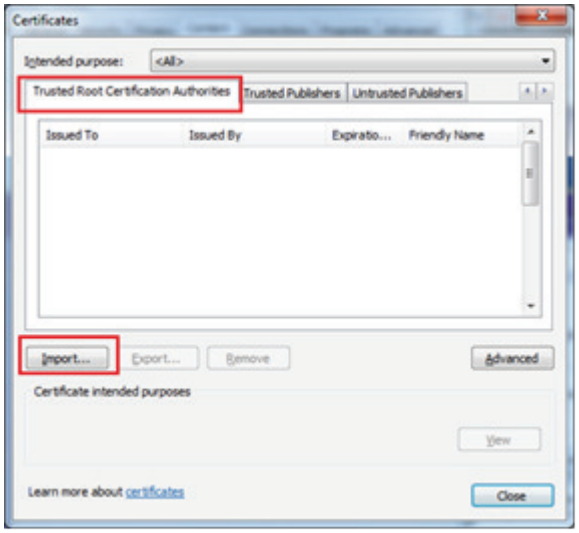
In the browser of the client device, register the certification authority (CA) that signed the server certificate as "Trusted Root Certification Authorities." (This step is not necessary if it is already registered.)

■Windows device (Windows 7)

Open the Internet Options screen in the browser. Select the "Content" tab and click [Certificates].

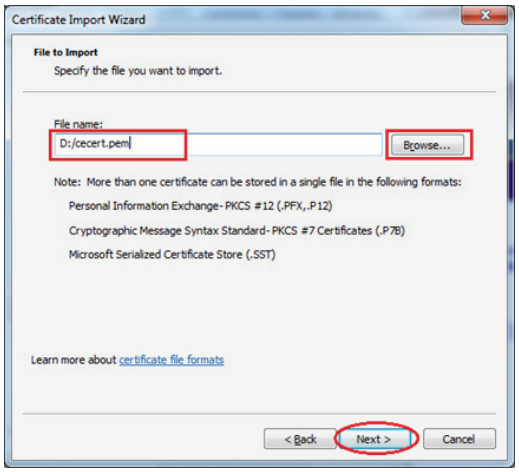


Select the "Trusted Root Certification Authorities" tab, and then click [Import].

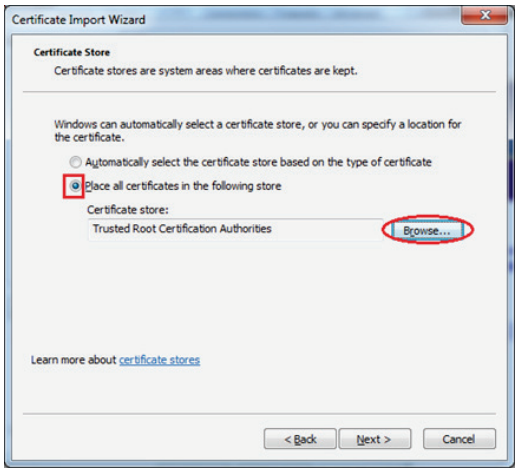


Click [Next].

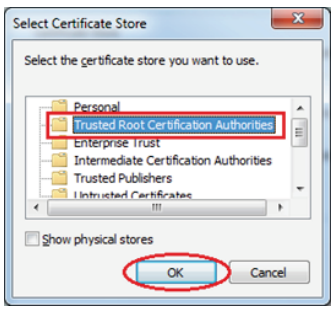
Click [Browse]. Specify the certificate file of the certification authority (CA) that signed the server certificate (in this example, “cecert.pem”), and then click [Next].



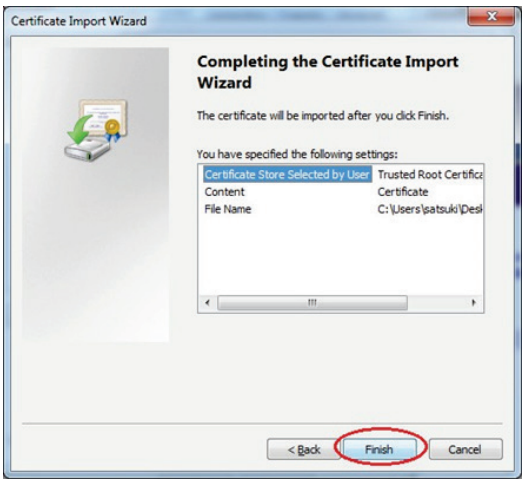
Select “Place all certificates in the following store,” and click [Browse].



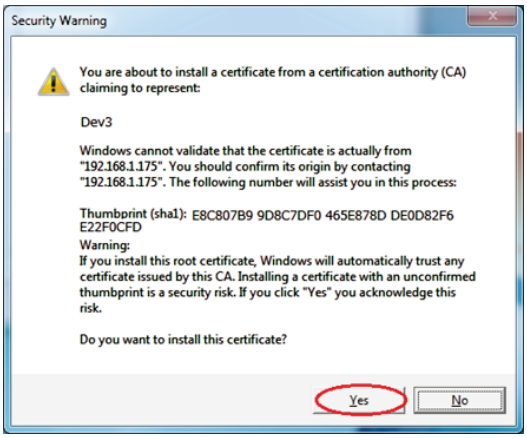
Select “Trusted Root Certification Authorities,” and click [OK].



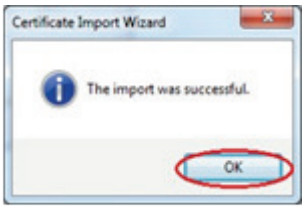
Click [Finish].



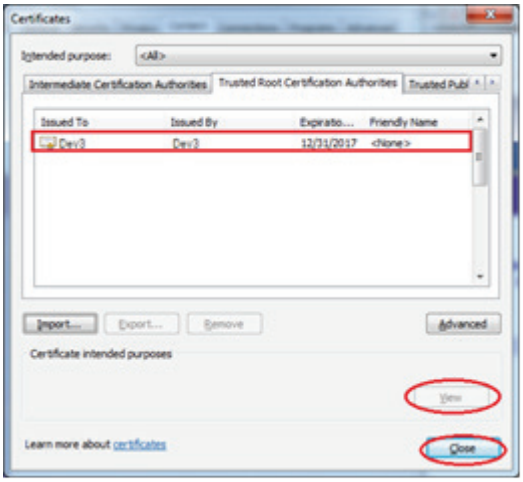
Click [Yes]. (The following shows “Dev 3” as an example name of the certification authority (CA) that has been imported to the printer.)



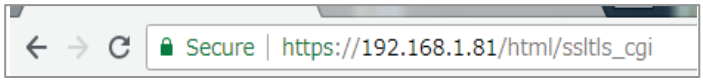
Click [OK].



Check that the certification authority (CA) has been registered. Click [View] to check the details of the certificate. Then, click [Close] to exit.



Turn on the printer again. You can access the web screen of the printer through the address beginning with “https://.”



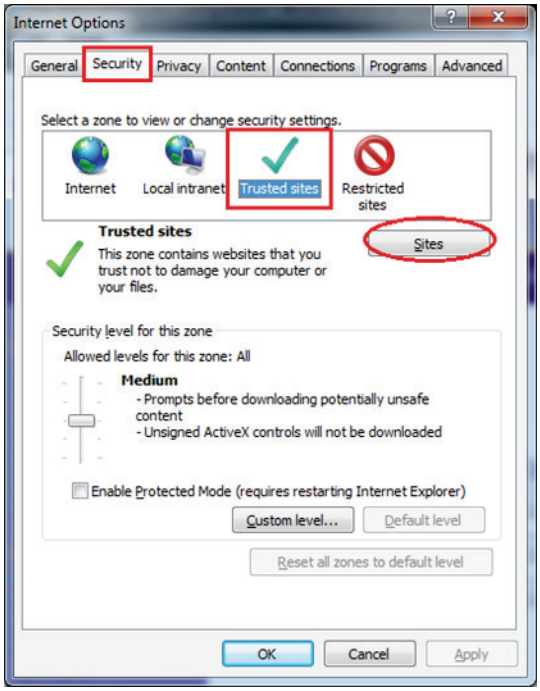
Note that depending on the environment of client devices, you may need to add the address to “Trusted sites.”

(→ Refer to “10.2.3 Supplementary information.”)

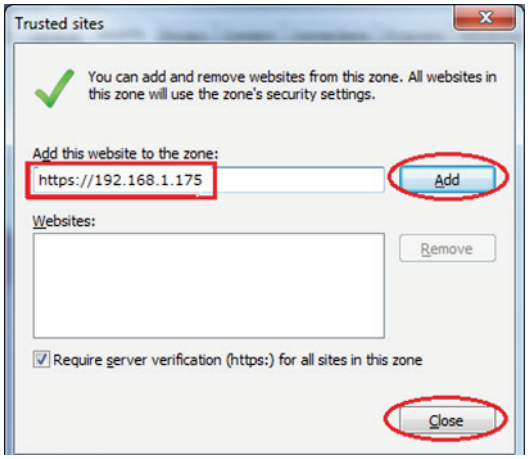
10.2.3. Supplementary information

Depending on the environment of client devices, you may need to add an address to “Trusted sites” in the browser. The following is a setting example on Internet Explorer (Windows).

In the “Security” tab of Internet Options, select “Trusted Sites,” and click [Sites].



Enter the printer’s IP address beginning with “https://” (the domain value of the certificate). Click [Add], and then click [Close].



Return to the Internet Options screen and click [OK] to exit.

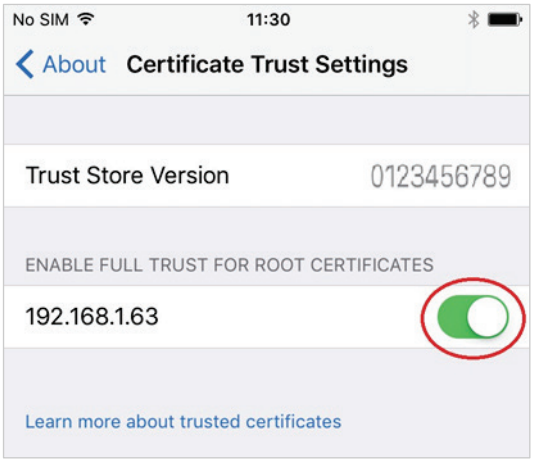
10.2.4. Setup required for the certificate registration with iOS 10.3 or later

With the iOS 10.3 or later, if a certificate has been manually installed, it is not automatically trusted for SSL communication. Setup with the iOS device is required.

As reference information, the following is a setup example with the iOS.

(For details, refer to the Apple website: https://support.apple.com/ja-jp/HT204477)

1. Import the certificate following the procedures of "■ iOS device in 3. Import the certificate to the browser", "10.2.1 Using a self-signed certificate."
2. Select in the order of "Settings" > "General" > "About" > "Certificate Trust Settings."
3. Under "Enable full trust for root certificates," turn on trust for the certificate.



10.3. Cipher suite support list

The following lists cipher suites supported by services that use SSL/TLS communication.

(✓: Supported, -: Not supported)

10.3.1. Web Configuration

Service name		Web Configuration
Firmware version		1.0 or later
Cipher suite name	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256	-
	TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384	-
	TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256	-
	TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA	-
	TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256	-
	TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384	-
	TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256	-
	TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384	-
	TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256	-
	TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA	-
	TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256	-
	TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA	-
	TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384	-
	TLS_RSA_WITH_AES_128_GCM_SHA256	-
	TLS_RSA_WITH_AES_256_GCM_SHA384	-
	TLS_RSA_WITH_AES_128_CBC_SHA	✓
	TLS_RSA_WITH_AES_128_CBC_SHA256	-
	TLS_RSA_WITH_AES_256_CBC_SHA	✓
	TLS_RSA_WITH_AES_256_CBC_SHA256	-
	TLS_RSA_WITH_3DES_EDE_CBC_SHA	✓
	TLS_RSA_WITH_RC4_128_SHA	✓
	TLS_RSA_WITH_RC4_128_MD5	✓

10.3.2. Star CloudPRNT

Service name		Star CloudPRNT			
Firmware version		1.0 or later			
TLS1.3		ENABLE(*)		DISABLE	
Encryption level setting of TLS1.2 cypher suite		HIGH + MEDIUM(*)	MEDIUM	HIGH + MEDIUM(*)	MEDIUM
Cipher suite name	TLS_AES_128_GCM_SHA256	✓	✓	-	-
	TLS_AES_256_GCM_SHA384	✓	✓	-	-
	TLS_CHACHA20_POLY1305_SHA256	✓	✓	-	-
	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256	✓	-	✓	-
	TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384	✓	-	✓	-
	TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256	✓	-	✓	-
	TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA	✓	-	✓	-
	TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256	✓	-	✓	-
	TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384	✓	-	✓	-
	TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256	✓	-	✓	-
	TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384	✓	-	✓	-
	TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256	✓	-	✓	-
	TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA	✓	-	✓	-
	TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256	✓	-	✓	-
	TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA	✓	-	✓	-
	TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384	✓	-	✓	-
	TLS_RSA_WITH_AES_128_GCM_SHA256	✓	-	✓	-
	TLS_RSA_WITH_AES_256_GCM_SHA384	✓	-	✓	-
	TLS_RSA_WITH_AES_128_CBC_SHA	✓	✓	✓	✓
	TLS_RSA_WITH_AES_128_CBC_SHA256	✓	-	✓	-
	TLS_RSA_WITH_AES_256_CBC_SHA	✓	✓	✓	✓
	TLS_RSA_WITH_AES_256_CBC_SHA256	✓	-	✓	-
	TLS_RSA_WITH_3DES_EDE_CBC_SHA	✓	✓	✓	✓
	TLS_RSA_WITH_RC4_128_SHA	✓	✓	✓	✓
	TLS_RSA_WITH_RC4_128_MD5	✓	✓	✓	✓

(*) Factory default setting

10.4. Restrictions at the time of product replacement

The following are operating restrictions when TSP100IIU/TSP100IIU+/TSP100IIIU/TSP100IIILAN/TSP100IIIW/TSP100IIIBI/TSP100GT/TSP100IV is replaced with TSP100IV SK.

Driver version			Software after replacement						
			StarWindowsSoftware V3.4.0 or later	Star PRNT SDK V5.17.0 or later	StarXpand SDK ReactNative V1.4.0 or later	StarXpand SDK Native V2.4.0 (iOS)/V1.4.0 (Android) or later	Star JavaPOS Driver V1.13.14 or later	Star CUPS Driver V4.10.0 (Mac)/V3.14.0 (Linux) or later	PassPRNT V2.8.0 or later
Printer before replacement	Host OS	Software	TSP100IV SK USB/LAN						
TSP100IIIU/LAN/WLAN TSP100IIU/IIU+, TSP100GT	Windows	Before futurePRNT V7.0.0							
TSP100IIIU/LAN/WLAN TSP100IIU/IIU+, TSP100GT	Windows	futurePRNT V7.0.0 or later (Including OPOS)	Replaceable by transfer tool Functional restriction applied (https://www.star-m.jp/migration-assistant-oml.html)						
TSP100IIIU/LAN/WLAN TSP100IIU/IIU+, TSP100GT	Windows	futurePRNT V7.0.0 or later (JavaPOS only)					Replaceable by setting change - Specify the same logicalName for Jpos.xml. - Specify TSP100IV as the model of Jpos.xml. - Specify the printer after replacement as portName.		
TSP100IV	Windows	Before StarWindowsSoftware V3.4.0	Replaceable TSP100IV and TSP100IV SK use the same printer driver. - For USB, use the same USB serial number.						
TSP100IIIU/LAN/WLAN TSP100IIU/IIU+, TSP100GT TSP100IV	Windows Android iOS	StarPRNTSDK Before V5.17.0 (*) UWP does not support USB models.		Replaceable by setting change - Specify the printer after replacement as portName. - For USB, use the same USB serial number.					
TSP100IIIU/LAN/WLAN TSP100IIU+ TSP100IV	Windows Android iOS	Before StarXpand SDK ReactNative V1.4.0 (*) UWP does not support USB models.			Replaceable by setting change - Specify the printer after replacement as connection destination (identifier property).				

Driver version			Software after replacement StarWindowsSoftware V3.4.0 or later	Star PRNT SDK V5.17.0 or later	StarXpand SDK ReactNative V1.4.0 or later	StarXpand SDK Native V2.4.0 (iOS)/V1.4.0 (Android) or later	Star JavaPOS Driver V1.13.14 or later	Star CUPS Driver V4.10.0 (Mac)/V3.14.0 (Linux) or later	PassPRNT V2.8.0 or later
TSP100IIIU/LAN/WLAN TSP100IIU+ TSP100IV	Android iOS	Before StarXpand SDK Native V2.4.0 (iOS)/V1.4.0 (Android)				Replaceable by setting change - Specify the printer after replacement as connection destination (identifier property).			
TSP100IIIU/LAN/WLAN TSP100IV	Windows Android iOS	PassPRNT Before V2.8.0 (*) UWP does not support USB models.							Replaceable by setting change - Specify the printer after replacement as port query.
TSP100IIIU/LAN/WLAN TSP100IIU/IIU+, TSP100GT TSP100IV	Mac Linux	Before CUPS V4.10.0 (Mac)/V3.14.0 (Linux)						Replaceable by setting change - TSP100 series use the same printer driver. - Specify the same IP address for the LAN printer.	

<Note> The hold print function is enabled for TSP100IV SK as factory setting, so that its behavior is different from that of the printer before replacement. When the hold print function is enabled, paper is held after printing. Accordingly, the next printing will not be started. (Printing is enabled by removing the paper.)
Disable the hold print function if it is not necessary. Before use, be sure to fully check the operation.
***Refer to "Note *4) Hold print sensor in 2.1. General specifications."**

The following are operating restrictions when TSP650II SK is replaced with TSP100IV SK.

Driver version			Software after replacement							
			StarWindowsSoftware V3.4.0 or later	Star PRNT SDK V5.17.0 or later	StarXpand SDK ReactNative V1.4.0 or later	StarXpand SDK Native V2.4.0 (iOS)/V1.4.0 (Android) or later	Star JavaPOS Driver V1.13.14 or later	Star CUPS Driver V4.10.0 (Mac)/V3.14.0 (Linux) or later	PassPRNT V2.8.0 or later	futurePRNT
Printer before replacement	Host OS	Software	TSP100IV SK USB/LAN/USB-serial							
TSP650II SK	Windows	StarPRNT Intelligence Software	Setting transfer disabled. A printer queue must be created for TSP100IV.							
TSP650II SK	Windows Android iOS	StarPRNTSDK Before V5.17.0 (*) UWP does not support USB models.		Replaceable by setting change - Specify the printer after replacement as portName. - If StarIOExtention CommandBuilder is used, change the emulation from StarLine to StarPRNT.						
TSP650II SK	Windows Android iOS	Before StarXpand SDK ReactNative V1.4.0			Replaceable by setting change - Specify the printer after replacement as connection destination (identifier property).					
TSP650II SK	Android iOS	Before StarXpand SDK Native V2.4.0 (iOS)/V1.4.0 (Android)				Replaceable by setting change - Specify the printer after replacement as connection destination (identifier property).				
TSP650II SK	Windows Android iOS	PassPRNT Before V2.8.0 (*) UWP does not support USB models.							Replaceable by setting change - Specify the printer after replacement as port query.	

Driver version			Software after replacement							
			StarWindowsSoftware V3.4.0 or later	Star PRNT SDK V5.17.0 or later	StarXpand SDK ReactNative V1.4.0 or later	StarXpand SDK Native V2.4.0 (iOS)/V1.4.0 (Android) or later	Star JavaPOS Driver V1.13.14 or later	Star CUPS Driver V4.10.0 (Mac)/V3.14.0 (Linux) or later	PassPRNT V2.8.0 or later	futurePRNT
TSP650II SK	Windows Mac Linux	Before Star JavaPOS Driver V1.13.14					Replaceable by setting change - Specify the same logicalName for Jpos.xml. - Specify TSP100IV as the model of Jpos.xml. - Specify the printer after replacement as portName.			
TSP650II SK	Mac Linux	Before CUPS V4.10.0 (Mac)/V3.14.0 (Linux) (*) Serial communication not supported						A queue must be created for TSP100.		

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Special Products Division
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