

TOSHIBA

TOSHIBA Bar Code Printer

B-852-TS22-QQ/QP-R

Expansion I/O Specification

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TOSHIBA TEC CORPORATION

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1. SCOPE

This specification applies to expansion input/output (I/O) specification for the general-purpose bar code printers.

1.1 APPLICABLE MODEL

B-852-TS22-QQ-R

B-852-TS22-QP-R

2. GENERAL DESCRIPTION

By using the expansion I/O, the printer can feed and issue labels or indicate printer states, according to the external input/output signals, in addition to using commands from the PC. This allows interfacing with external equipment such as a labeler.

3. ELECTRICAL SPECIFICATIONS

3.1 PIN ASSIGNMENT

Connector: FCN-685JO024 or equivalent

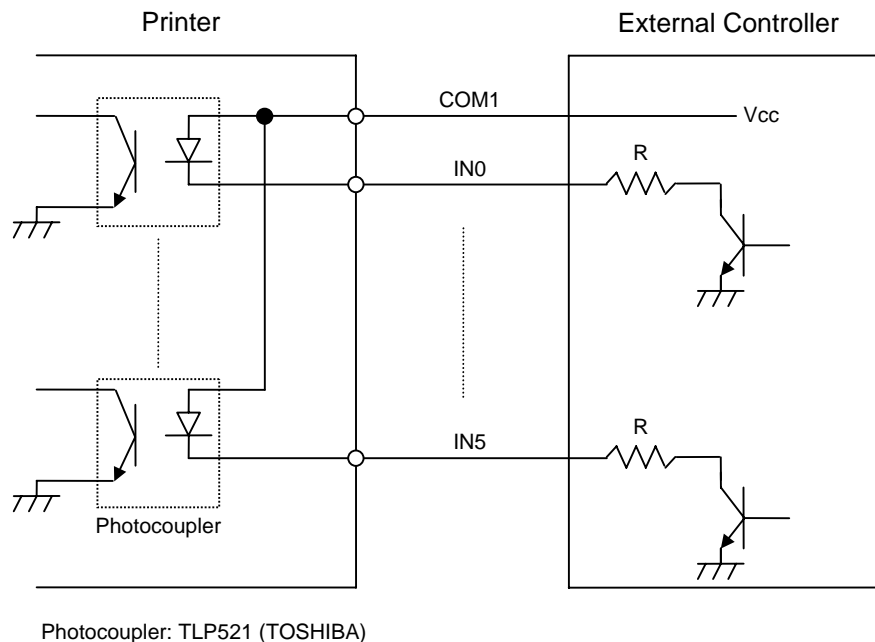
Connector of the controller:
FCN-781P024-G/P or equivalent

No.	Signal Name	Direction
1	IN0	Input
2	IN1	Input
3	IN2	Input
4	IN3	Input
5	IN4	Input
6	IN5	Input
7	OUT0	Output
8	OUT1	Output
9	OUT2	Output
10	OUT3	Output
11	OUT4	Output
12	OUT5	Output

No.	Signal Name
13	OUT6
14	N.C
15	COM1
16	N.C
17	N.C
18	N.C
19	N.C
20	N.C
21	COM2
22	N.C
23	N.C
24	N.C

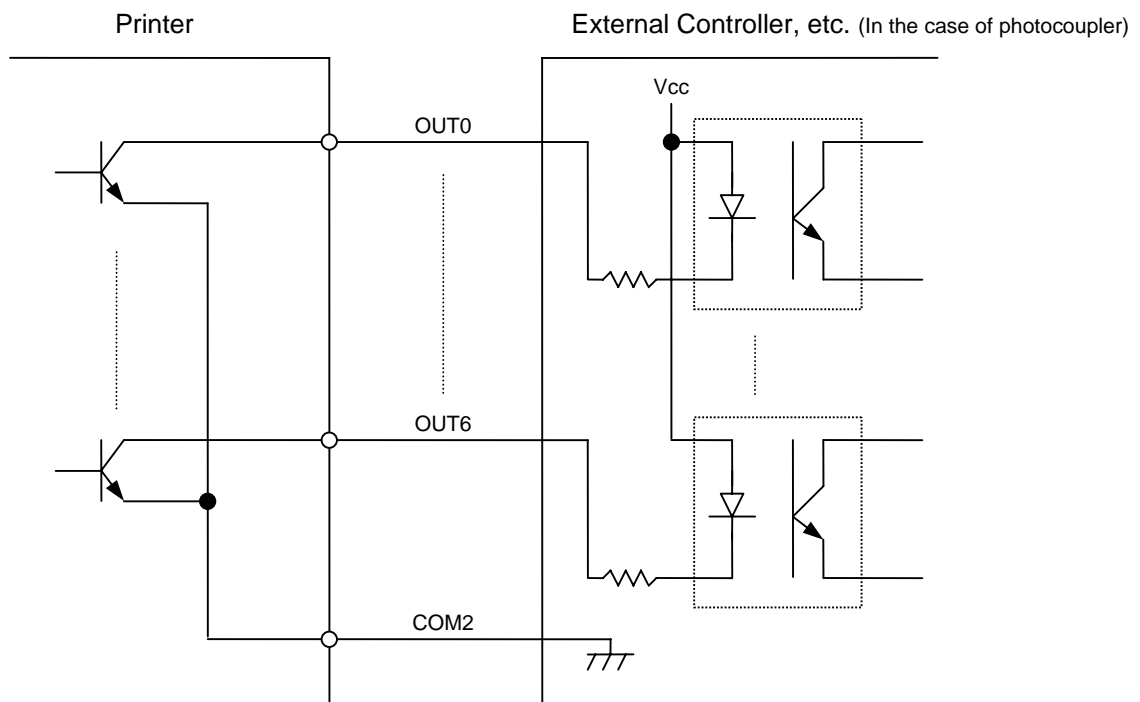
3.2 INTERFACE CIRCUIT

(1) Input circuit



There are 6 input circuits, and each input is a current loop using the photocoupler. The anode of the photocoupler is connected to the common pin COM1 in each of the 6 circuits. The cathodes are independent. The voltage of Vcc is 24 V (max.) while the diode operating current is 16 mA.

(2) Output circuit



There are 7 output circuits, and each output is an open collector. The voltage of V_{cc} is 24 V (max.) while the drive current is 150 mA.

4. SOFTWARE SPECIFICATIONS

There are two types of software specifications, for the standard mode and the in-line mode. The type can be selected in the system mode setting.

TYPE1: Standard mode

TYPE2: In-line mode

4.1 STANDARD SPECIFICATIONS

4.1.1 OUTLINE OF SIGNALS

Input

- IN0. FEEDFeeds one label.
- IN1. ISSUEIssues one label.
- IN2. PAUSETemporarily stops label printing.
- IN3. PRE-BACKFEEDFeeds a label back to the home position.
- IN4. Not used
- IN5. Not used

Output

- OUT0. FEEDINGIndicates the printer is feeding a label.
- OUT1. ISSUING.....Indicates the printer is issuing a label.
- OUT2. PAUSINGIndicates the printer is in a pause state.
- OUT3. ERRORIndicates the printer is in an error state.
- OUT4. Not usedThe signal is always off.
- OUT5. POWER ONIndicates the printer power is on (without software control).
- OUT6. Not used

IN0

FEED

When the signal goes from off to on, the printer feeds one label. If the signal is on when the feed is completed, the printer feeds one more label.

The FEED signal input is ignored, when the printer is in any of the following states.

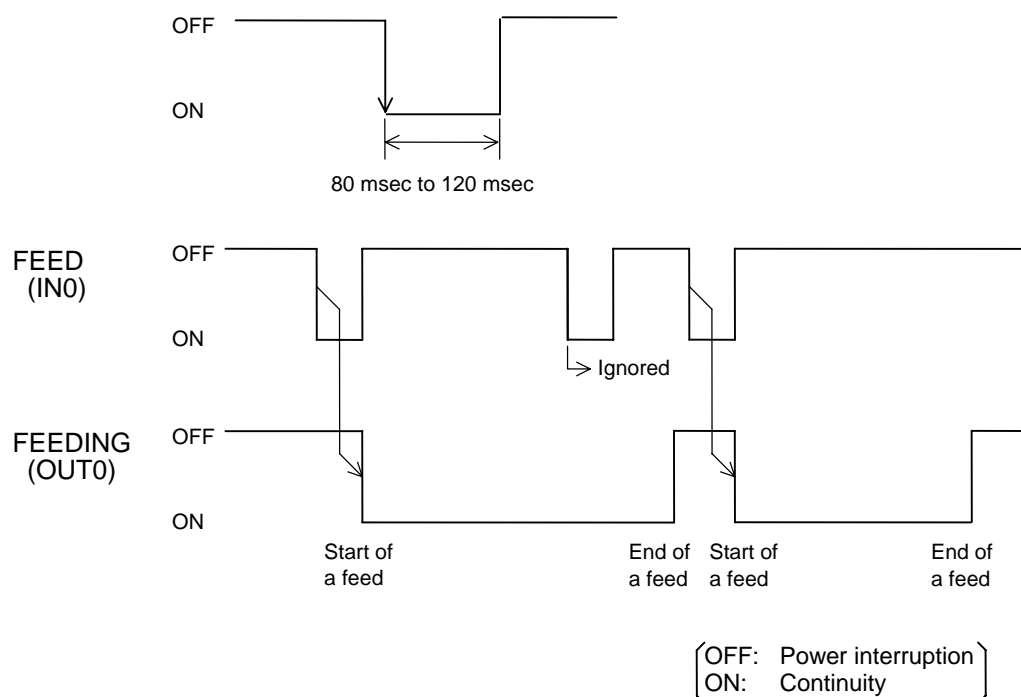
- Issuing
- Feeding
- Ejecting
- Manual feeding
- Checking for print head broken dots
- Command save mode
- Writable character store mode
- Communication error (command error or hardware error)
- System mode
- Performing a pre-backfeed

When the manual forward feed length has been set, a feed is performed by a value of one label feed length plus a manual forward feed length.

When the printer is in a state after an auto forward feed in the cut issue mode, it performs the following operations.

One label feed → Feed to the cut position → Cut → Reverse feed to the home position → Forward feed

When the printer is in a state after a pre-backfeeding, it feeds the label for the length of a pre-backfeed in addition to one label length.



When the signal goes from off to on, the printer prints the data in the image buffer on one label. If the signal is on when the issue is completed, the printer issues one more label.

The ISSUE signal input is ignored, when the printer is in any of the following states.

- Issuing
- Feeding
- Pausing
- Engine error
- Ejecting
- Manual feeding
- Checking for print head broken dots
- Command save mode
- Writable character store mode
- Communication error (command error, hardware error)
- System mode
- Performing a pre-backfeed

After a label is issued by an Issue Command sent from the host, the ISSUE signal allows the same label to be printed. This signal does not substitute for the Issue Command. If the ISSUE signal goes on under the following conditions, printing is not performed properly.

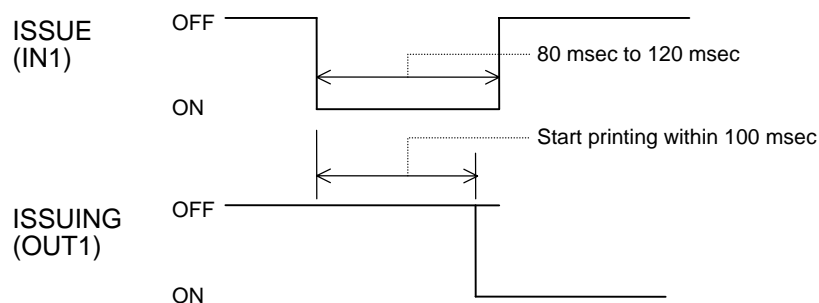
- An Issue Command is not sent.
- The image buffer clear and drawing are performed after an Issue Command is sent. However, an Issue Command is not sent again.

In this case, a label may not be issued, and a status response may be returned.

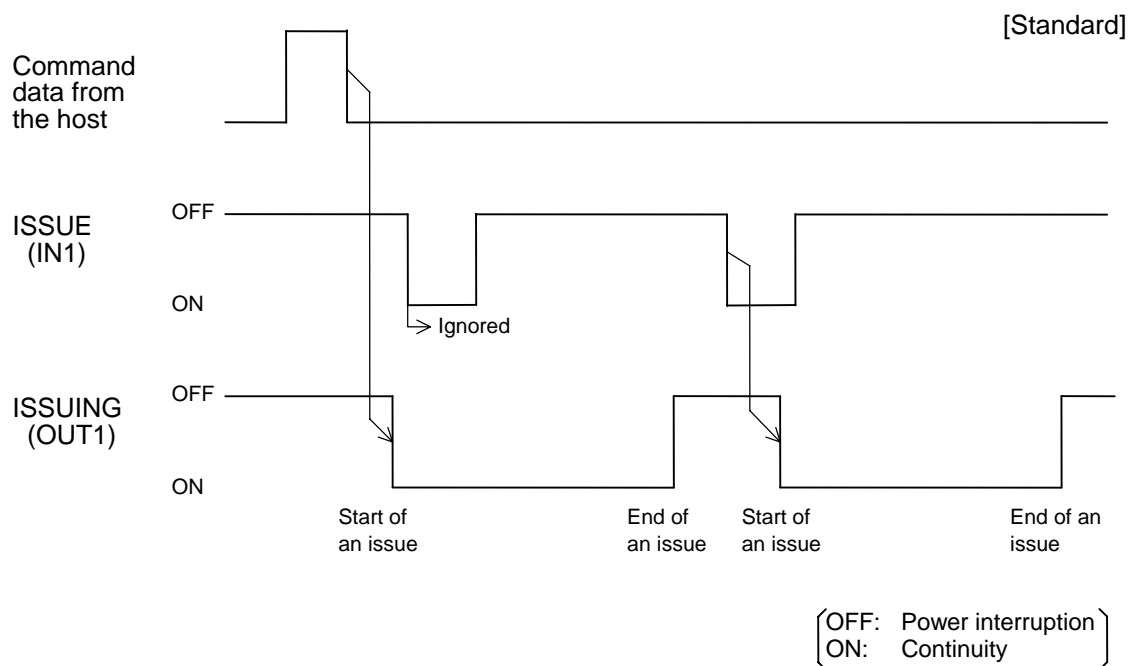
When the printer is in a state after an auto forward feed function in the cut issue mode, it performs the following operations.

One label feed → Feed to the cut position → Cut → Reverse feed to the home position → Forward feed

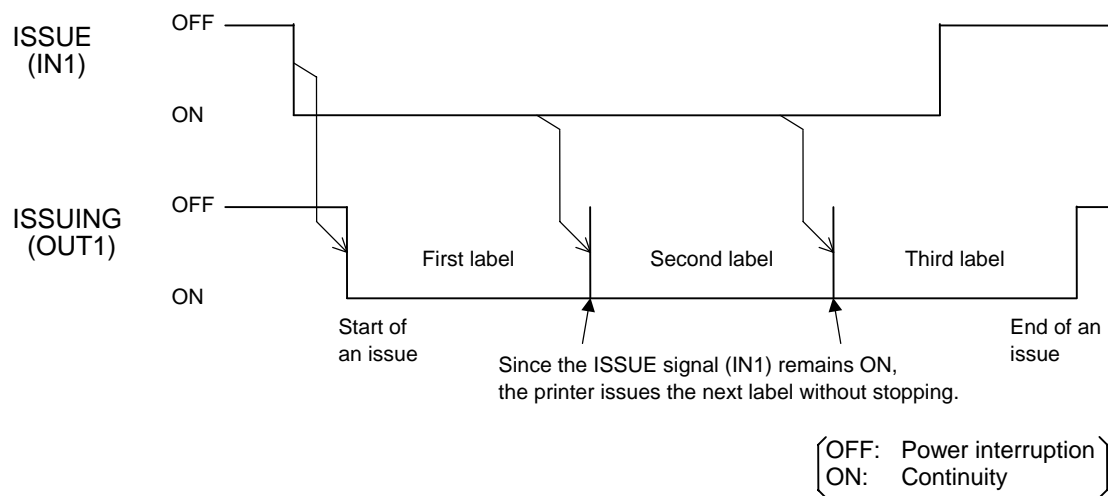
When the printer is in a state after a pre-backfeeding, it feeds the label for the length of a pre-backfeed and issues one label (+ feeds the label to the stop position for strip issue.)



(OFF: Power interruption)
 (ON: Continuity)

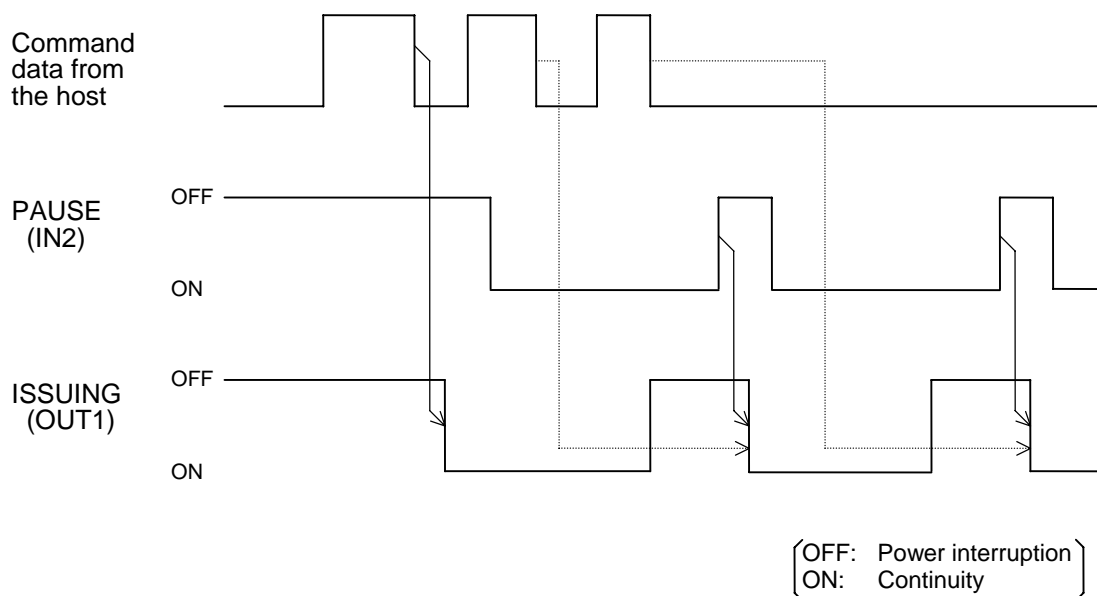


NOTE: While a label is being issued by the ISSUE signal (IN1), a Clear Command or Drawing Command should not be sent from the host, since the data may not be printed properly.



The printer enters a pause state by this signal. While the PAUSE signal is on, the printer does not issue a label. When the signal goes off, the printer starts issuing.

If the PAUSE signal goes on while the printer is issuing or feeding a label, the printer does not stop an issue or a feed immediately. After issuing or feeding one label, the printer enters the pause state.



A pause state generated by the PAUSE signal cannot be cleared only by the [RESTART] key of the printer. However, the pause state, generated by the [PAUSE] key, can be cleared when the PAUSE signal goes from on to off.

An error can be cleared only by the [RESTART] key on the printer.

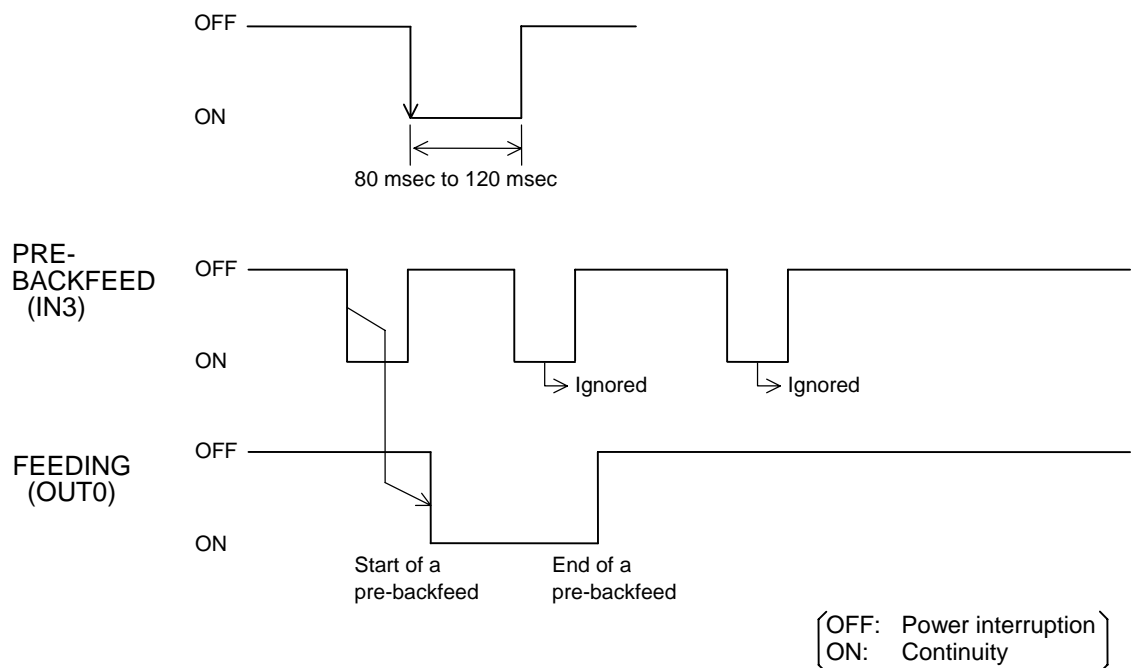
(The error cannot be cleared when the PAUSE signal goes from on to off.)

When the strip issue mode for auto labeler (Issue mode D or E) is selected, the printer feeds a label back to the home position when this signal goes from off to on.

The PRE-BACKFEED signal input is ignored when the printer is in any of the following states.

- Issuing
- Feeding
- Engine error
- Ejecting
- Manual feeding
- Checking for print head broken dots
- Command save mode
- Writable character store mode
- Communication error (command error, hardware error)
- System mode
- Performing a pre-backfeed

While the label is at the home position by a pre-backfeeding, the subsequent PRE-BACKFEED signals are ignored.



This output signal indicates that the printer is feeding a label.

The signal is on during a feed. Feeding means the following states.

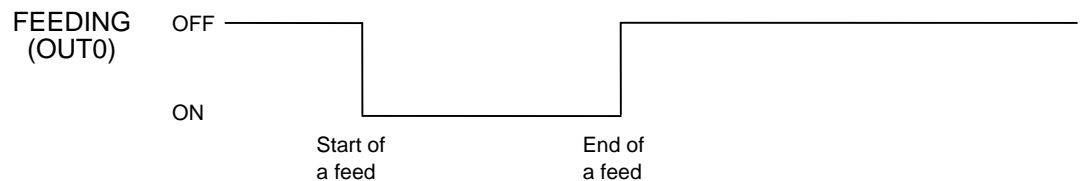
- Normal feeding
- Ejecting by the Eject Command from the host
- Ejecting for a cut issue
- Reverse feeding for a strip issue mode for auto labeler
- Manual forward/reverse feeding
- Initial feed when the printer restarts after an error is cleared.
- Performing a pre-backfeed

When the printer completes a feed normally, the signal goes off.

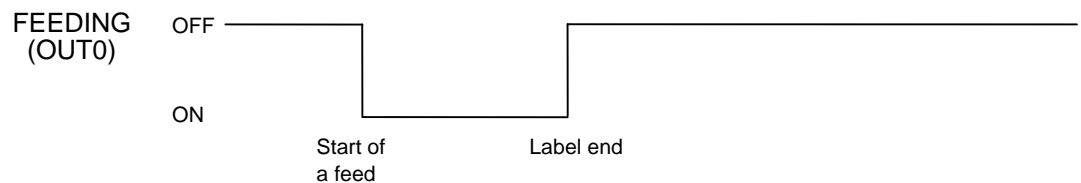
The FEEDING signal is output for a feed by any of the following: the [FEED] key, a command from the host, or the FEED signal.

When an error occurs during a feed and the printer stops feeding, the FEEDING signal goes off.

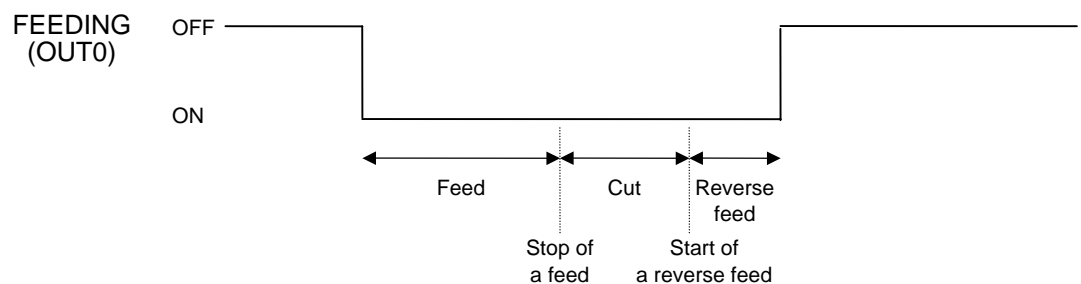
(1) Normal feed



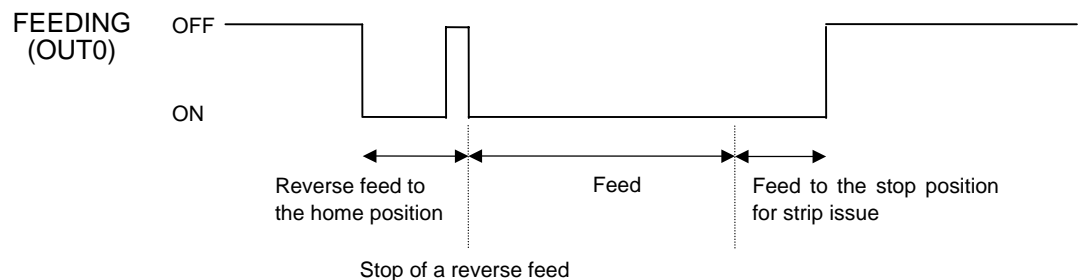
(2) Label end in the middle of a feed



(3) Feed with a cut



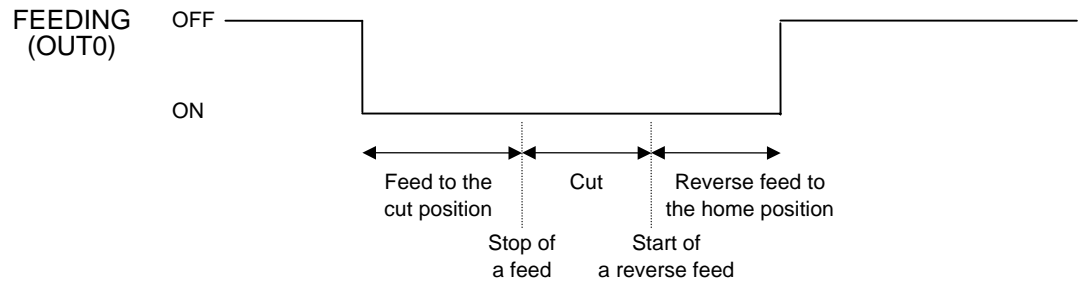
(4) Feed to the stop position for strip issue



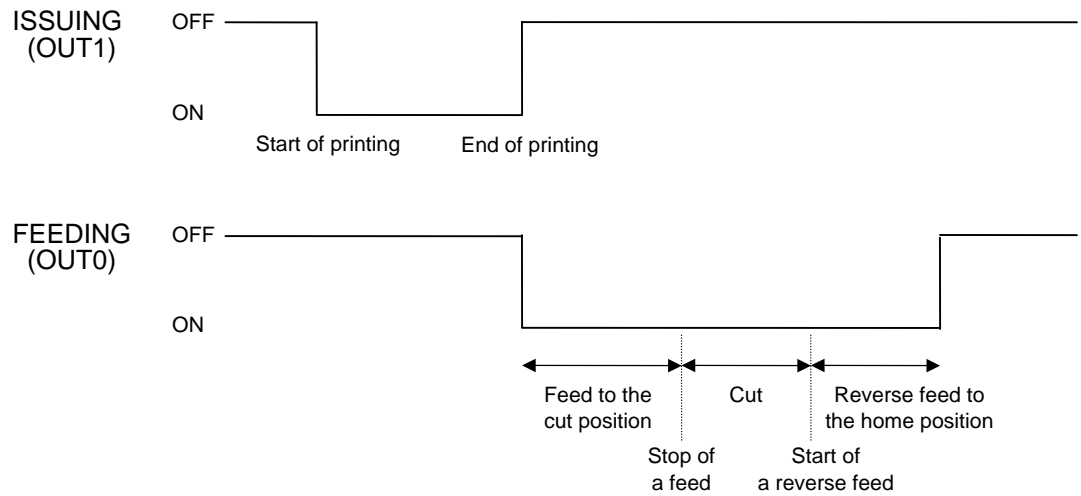
(OFF: Power interruption)
 (ON: Continuity)

(5) Ejection

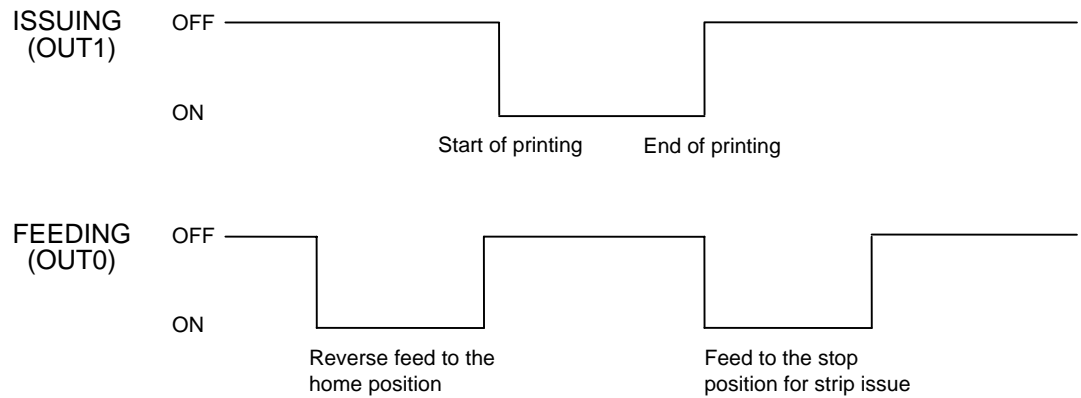
[Standard]



(6) Issue with a cut



(7) Strip issue mode for auto labeler



(OFF: Power interruption)
(ON: Continuity)

This output signal indicates that the printer is issuing a label.

The signal is on during an issue. In the batch issue mode, the signal goes off when the specified number of labels have been issued normally. However, when the printer performs batch issues without stopping between different batches, the signal remains on. In the strip issue mode for auto labeler, the signal goes off every time the printer issues one label normally. In the cut issue mode, the signal goes off while the printer is ejecting a label to cut.

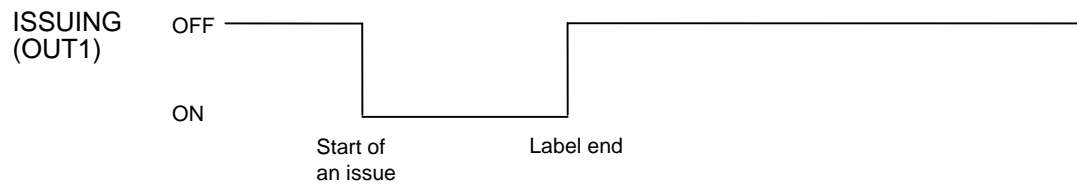
The ISSUING signal is output for any issue such as the self test results printout or test print in the system mode, or by a command from the host or the ISSUE signal. However, there may be moments where all output signals go on because the checks including the Expansion I/O loop back check are performed in the self-test.

When the printer pauses during issuing more than one labels, the signal goes off. After the pause state is cleared, the signal goes on again and the printer resumes printing the remaining number of labels.

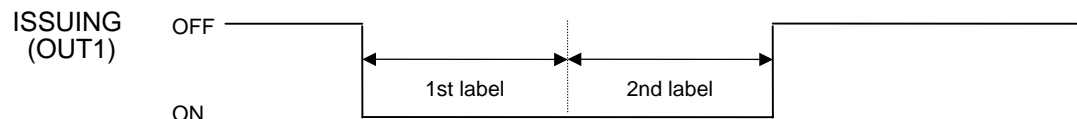
(1) Normal issue



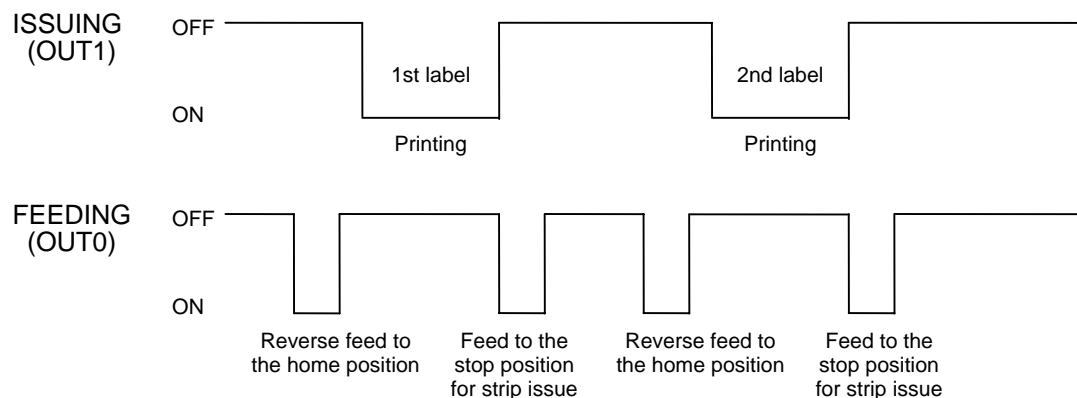
(2) Label end in the middle of an issue



(3) Batch issue (2 labels to issue)

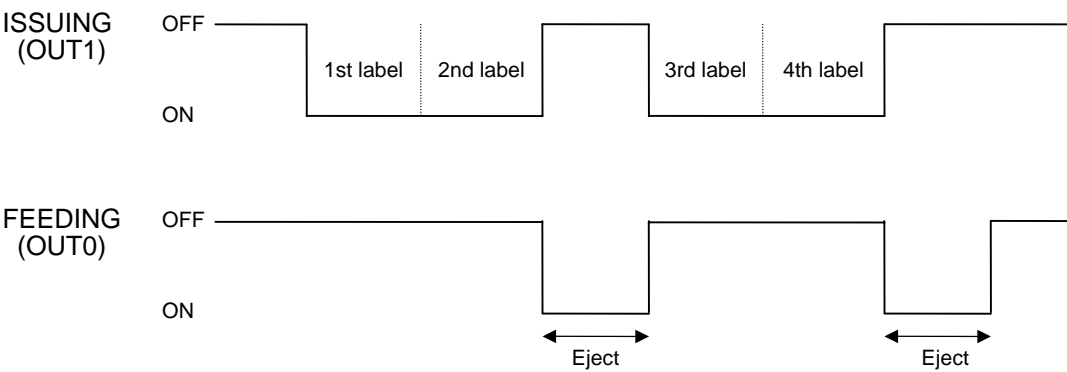


(4) Strip issue mode for auto labeler (2 labels to issue)

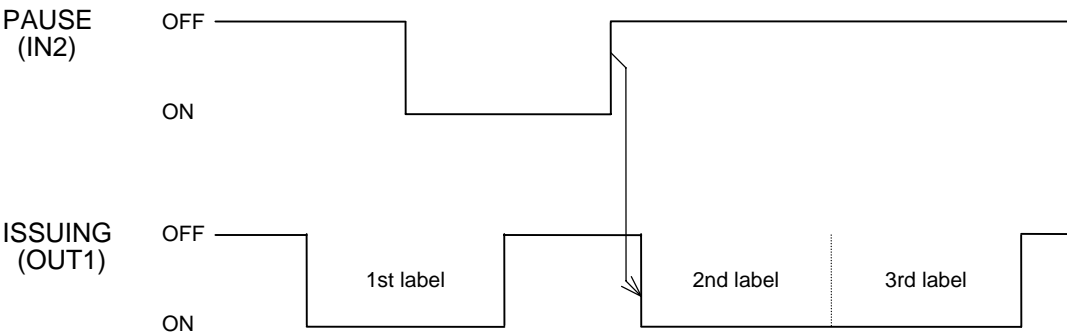


OFF: Power interruption
ON: Continuity

(5) Cut issue (4 labels to issue, cut every 2 labels) [Standard]



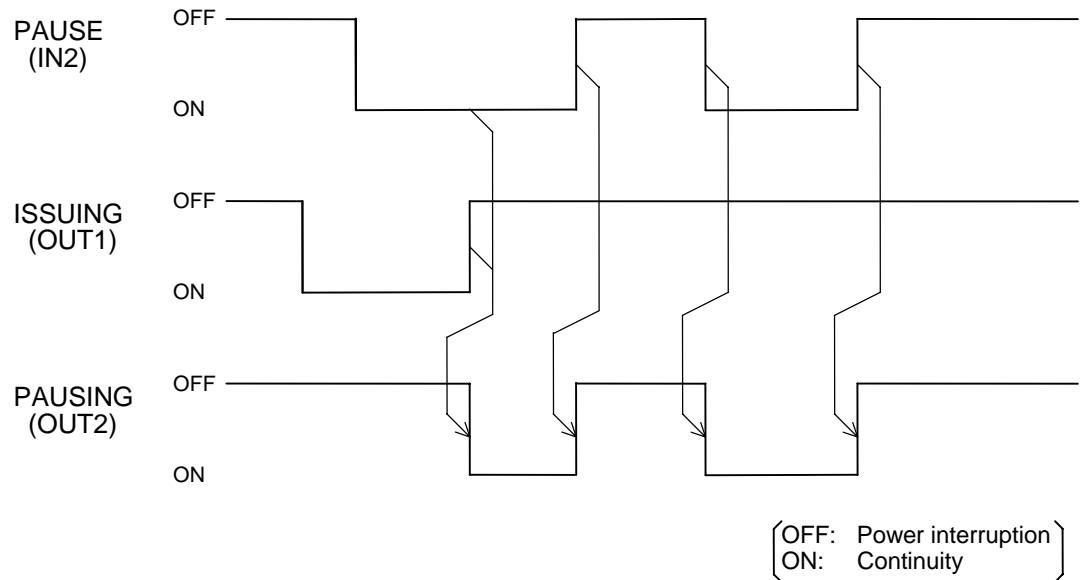
(6) Batch issue (3 labels to issue, pause during printing)



This output signal indicates that the printer is in a pause state.

While the printer is in a pause state, the signal goes on. The PAUSING signal is output for any pausing state caused by either the [PAUSE] key or PAUSE signal.

Also, when the print head is opened, the PAUSING signal goes on.



Even if the PAUSE signal is input during issuing or feeding, the PAUSING signal is not output until the issuing or feeding is completed.

If the PAUSE signal (IN2) is input when the printer is in an error state, it is ignored.

This output signal indicates that an error occurred causing the printer to stop.

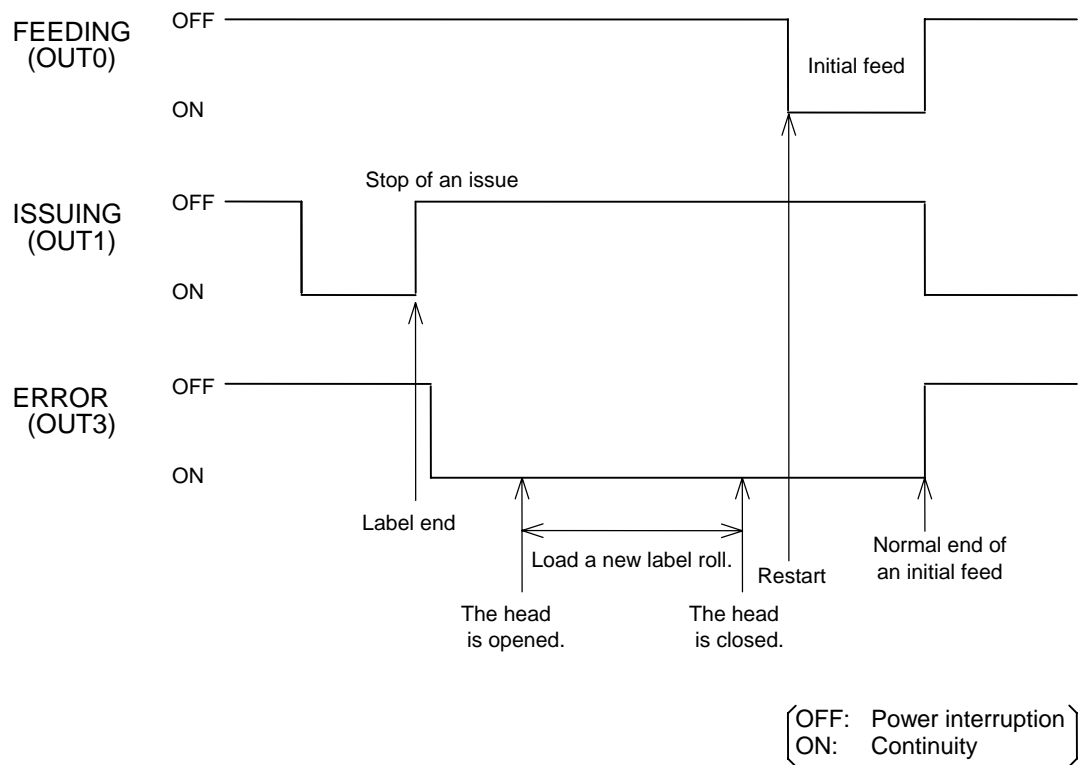
The signal goes on while the printer is in an error state.

When any of the following errors occur, the ERROR signal goes on.

- Communication error (Command error)
- Communication error (Hardware error)
- Paper jam
- Cutter error
- Paper end
- Ribbon error
- Head open error
- Thermal head error
- Thermal head overheating
- Writing error of the flash memory
- Erasing error of the flash memory
- Insufficient free space of the flash memory

When the error state is cleared, the ERROR signal goes off.

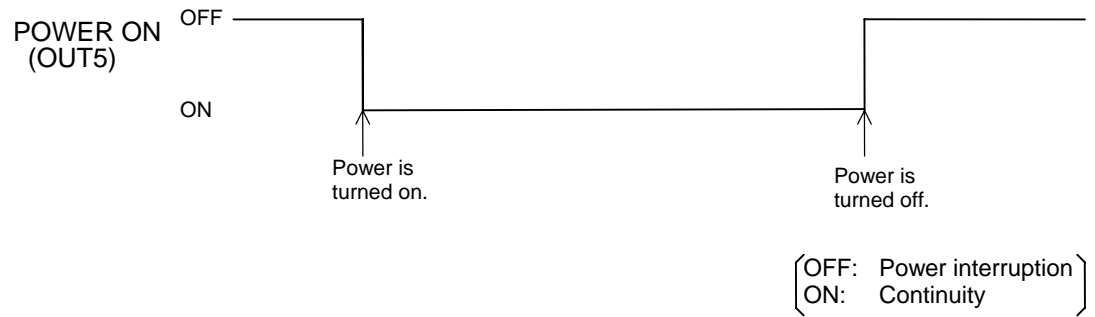
When an error cannot be cleared by pressing the [RESTART] key, the printer is not restored without turning the power off and on again.



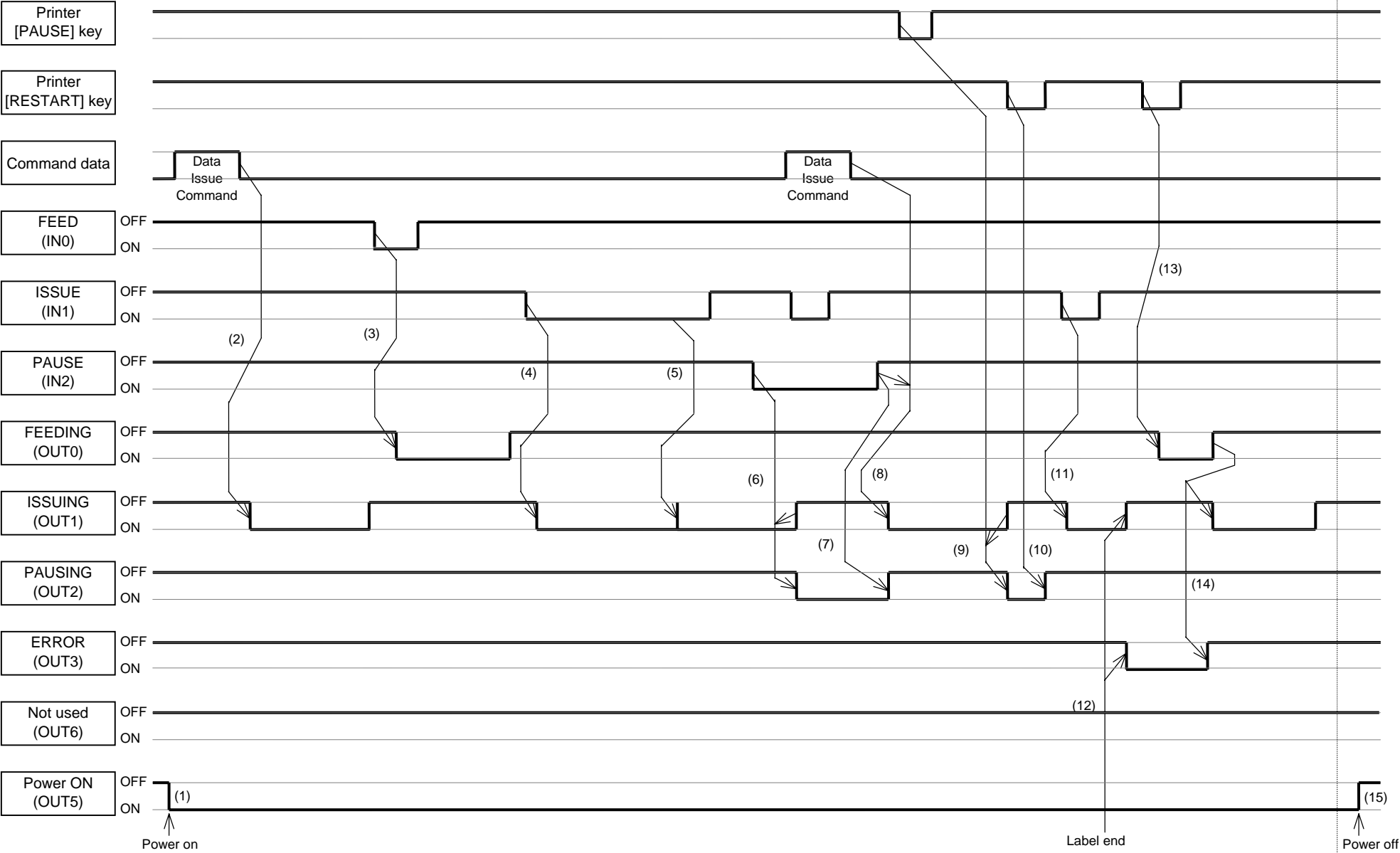
This output signal indicates that the printer power is on.

While the printer power is on, the signal is on.

While the printer power is on, the POWER ON signal remains on, no matter what state the printer is in.



4.1.3 EXAMPLE OF TIMING CHART (STANDARD SPECIFICATIONS)



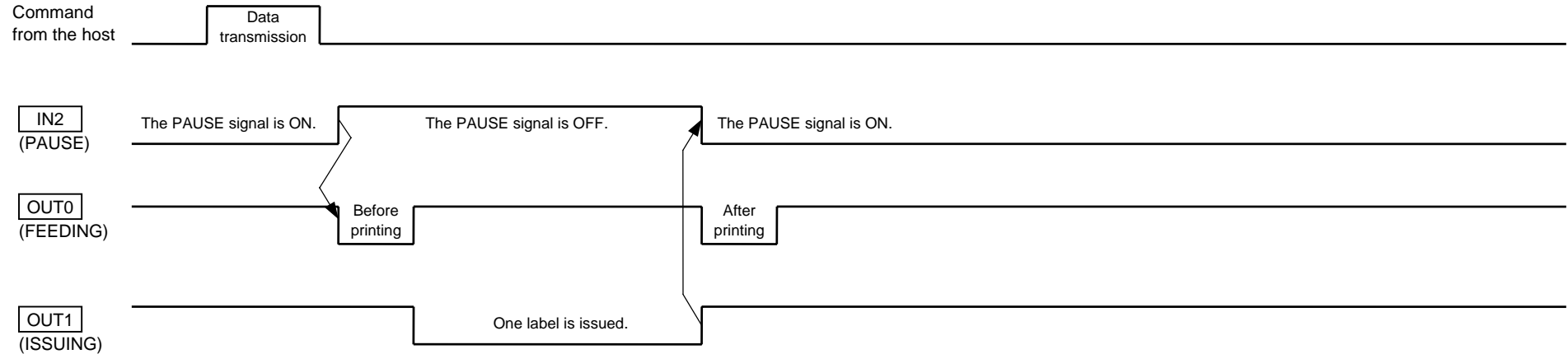
Explanation of Timing Chart (Standard Specifications)

- (1) When the power is turned on, the **OUT5** (POWER ON) goes on.
- (2) The printer starts issuing by the command from the host. The **OUT1** (ISSUING) goes on.
- (3) The printer starts feeding by the **IN0** (FEED). The **OUT0** (FEEDING) goes on.
- (4) The printer starts issuing by the **IN1** (ISSUE). The **OUT1** (ISSUING) goes on.
- (5) The printer starts issuing by the **IN1** (ISSUE). The **OUT1** (ISSUING) goes on.
- (6) After the issue is completed, the printer enters into a pause state by the **IN2** (PAUSE). The **OUT2** (PAUSING) goes on.
- (7) The pause state is cleared when the **IN2** (PAUSE) goes off. The **OUT2** (PAUSING) goes off.
- (8) The pause state is cleared when the **IN2** (PAUSE) goes off. Then the printer starts issuing by the command from the host. The **OUT1** (ISSUING) goes on.
- (9) After the issue is completed, the printer enters into a pause state by the [PAUSE] key on the printer. The **OUT2** (PAUSING) goes on.
- (10) The pause state is cleared by the [RESTART] key on the printer. The **OUT2** (PAUSING) goes off.
- (11) The printer starts issuing by the **IN1** (ISSUE). The **OUT1** (ISSUING) goes on.
- (12) The printer stops issuing because a label end error occurred during an issue. The **OUT1** (ISSUING) goes off and the **OUT3** (ERROR) goes on.
- (13) The printer starts an initial feed by the [RESTART] key on the printer. (The **OUT0** (FEEDING) goes on.)
- (14) After the initial feed is completed, the error state is cleared (the **OUT3** (ERROR) goes off) and the printer resumes issuing (the **OUT1** (ISSUING) goes on).
- (15) When the power is turned off, the **OUT5** (POWER ON) goes off.

⎧ OFF: Power interruption
ON: Continuity

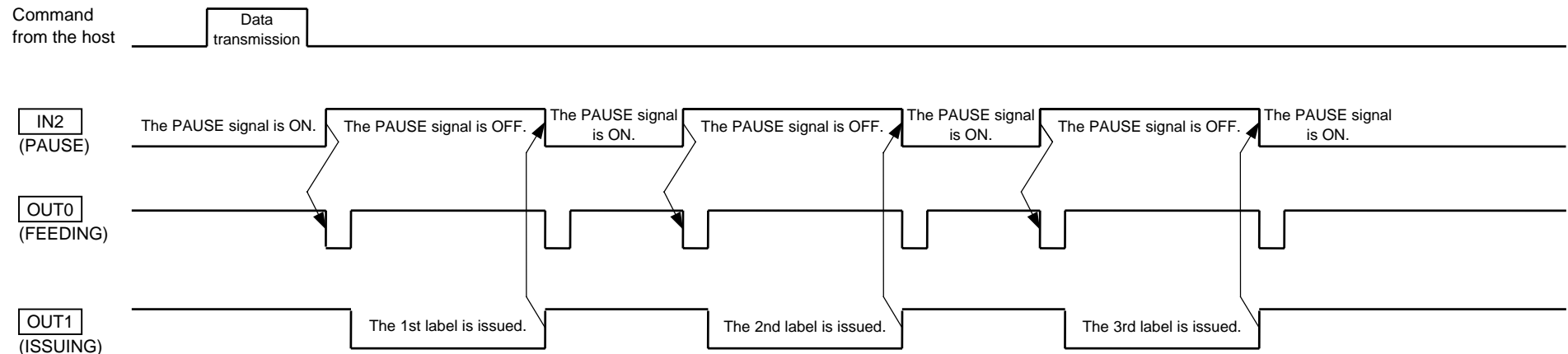
Example of Timing Charts for Issue/Feed Mode D or E (Strip issue mode for auto labeler)

(1) When one label is issued:



- When issue mode D or E is selected, an issue is started by the IN2 (PAUSE).
- The data transmission is performed when the IN2 (PAUSE) goes on, and an issue is started when the IN2 (PAUSE) goes off.
- The IN2 (PAUSE) goes on at the timing of the rise of the OUT1 (ISSUING).
- If the next label to be issued is the same as the previous one, an issue is started when the IN2 (PAUSE) goes off.
- If the next label to be issued is different from the previous one, an issue is started when the IN2 (PAUSE) goes off, after the next label data is sent.

(2) When three labels are issued:



4.2 IN-LINE SPECIFICATIONS

[In-line]

4.2.1 OUTLINE OF SIGNALS

Input

- IN0. FEED Feeds one label.
- IN1. ISSUE Issues one label.
- IN2. ACTIVATE Starts processing the Issue Command
- IN3. PRE-BACKFEED Feeds a label back to the home position.
- IN4. Not used
- IN5. Not used

Output

- OUT0. FEEDING Indicates the printer is feeding a label.
- OUT1. ISSUING Indicates the printer is issuing a label.
- OUT2. ACTIVE Indicates whether or not the printer is active.
- OUT3. ERROR Indicates the printer is in an error state.
- OUT4. Not used The signal is always off.
- OUT5. POWER ON Indicates the printer power is on (without software control).
- OUT6. Not used

IN0

FEED

When the signal goes from off to on, the printer feeds one label. If the signal is on when the feed is completed, the printer feeds one more label.

The FEED signal input is ignored, when the printer is in any of the following states.

- Issuing
- Feeding
- Manual feeding
- Ejecting
- Checking for print head broken dots
- Command save mode
- Writable character store mode
- Communication error (command error or hardware error)
- System mode
- Performing a pre-backfeed

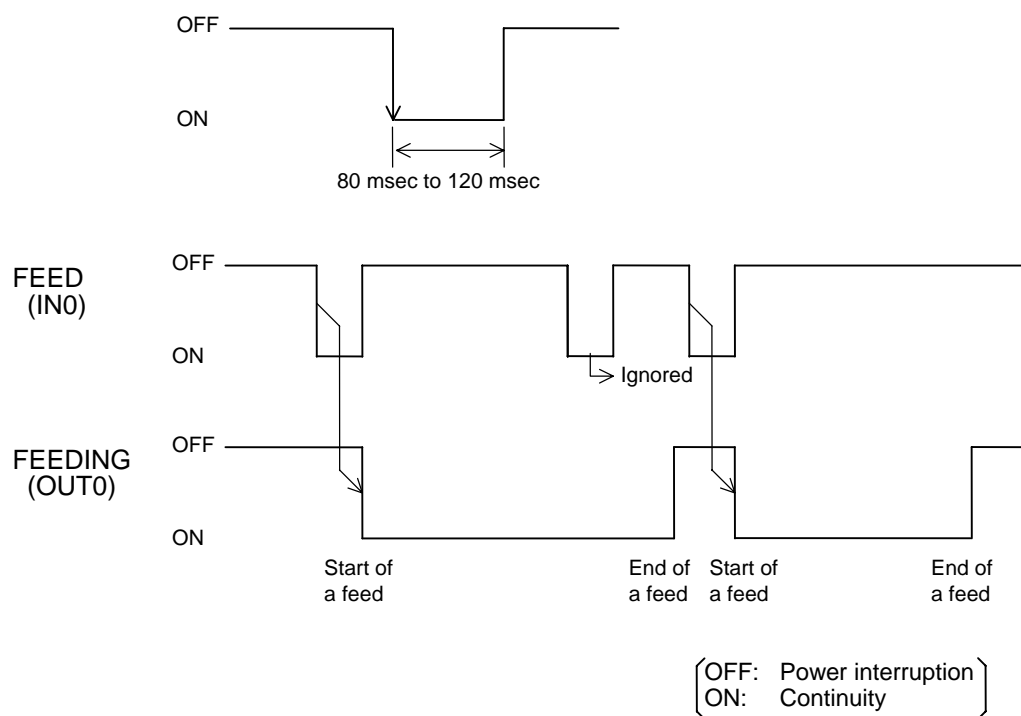
When the manual forward feed length has been set, a feed is performed as described below.

A feed length to be performed = Feed length of a label + Manual forward feed length

When the printer is in a state after an auto forward feed in the cut issue mode, it performs the following operations.

One label feed → Feed to the cut position → Cut → Reverse feed to the home position → Forward feed

When the printer is in a state after a pre-backfeeding, it feeds the label for the length of a pre-backfeed and issues one label.



When the signal goes from off to on, the printer prints the data in the image buffer on one label. If the signal is on when the issue is completed, the printer issues one more label.

The ISSUE signal input is ignored, when the printer is in any of the following states.

- Issuing
- Feeding
- Pausing
- Inactive
- Engine error
- Manual feeding
- Checking for print head broken dots
- Command save mode
- Writable character store mode
- Communication error (command error, hardware error)
- System mode
- Performing a pre-backfeed

After a label is issued by an Issue Command sent from the host and the ACTIVATE signal (IN2), the ISSUE signal allows the same label to be printed. This signal does not substitute for the Issue Command. If the ISSUE signal goes on under the following conditions, printing is not performed properly.

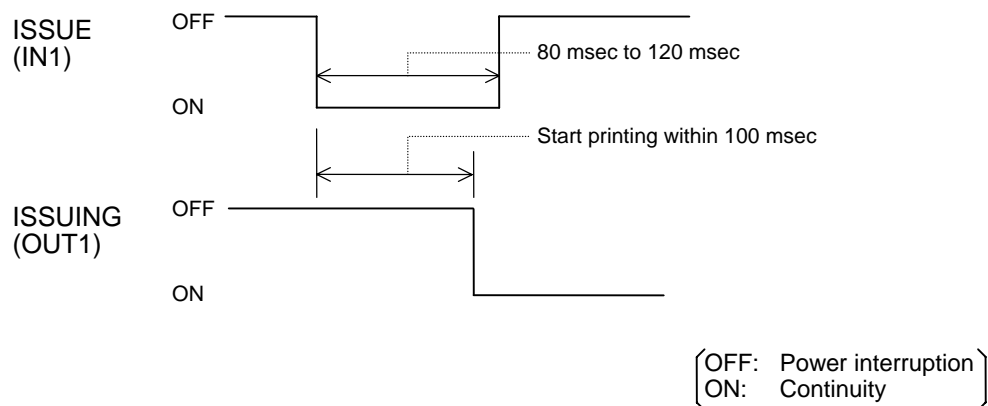
- An Issue Command is not sent.
- An issue is not performed by the ACTIVATE signal after an Issue Command is sent.
- The image buffer clear and drawing are performed after an Issue Command is sent. However, an Issue Command is not sent again.

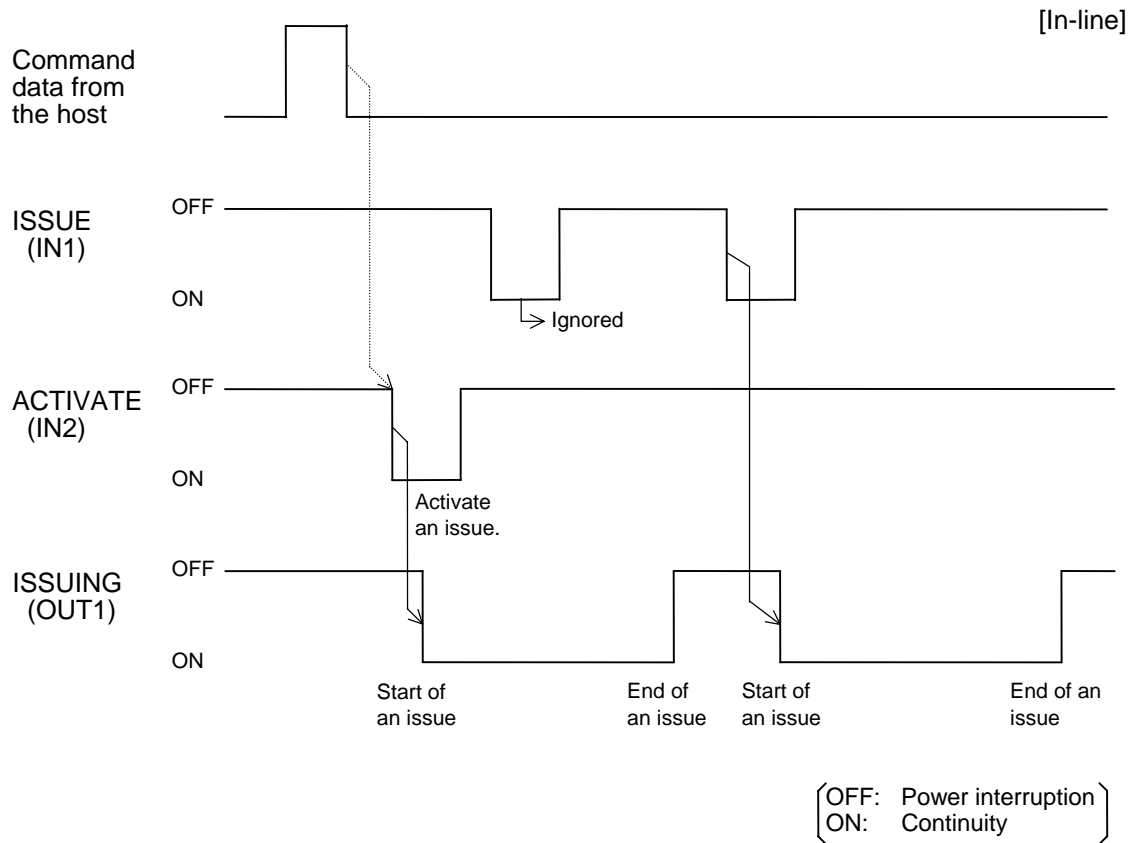
In this case, a label may not be issued, and a status response may be returned.

When the printer is in a state after an auto forward feed in the cut issue mode, it performs the following operations.

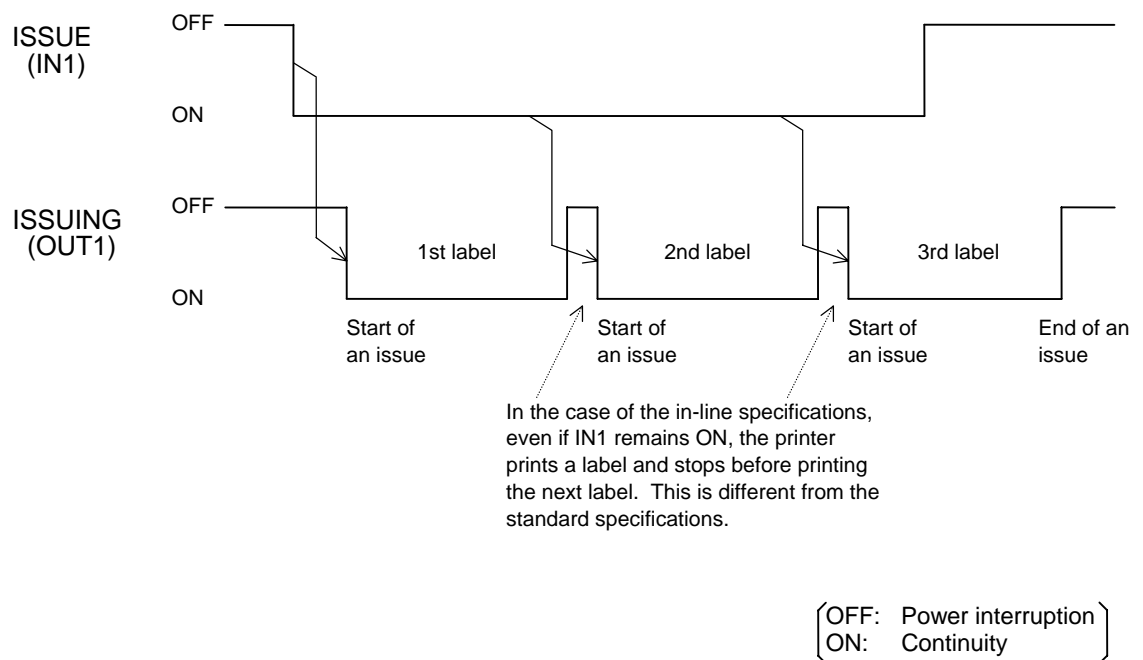
One label printing → Feed to the cut position → Cut → Reverse feed to the home position → Forward feed

When the printer is in a state after a pre-backfeeding, it feeds the label for the length of a pre-backfeed and issues one label (+ feeds the label to the stop position for strip issue.)





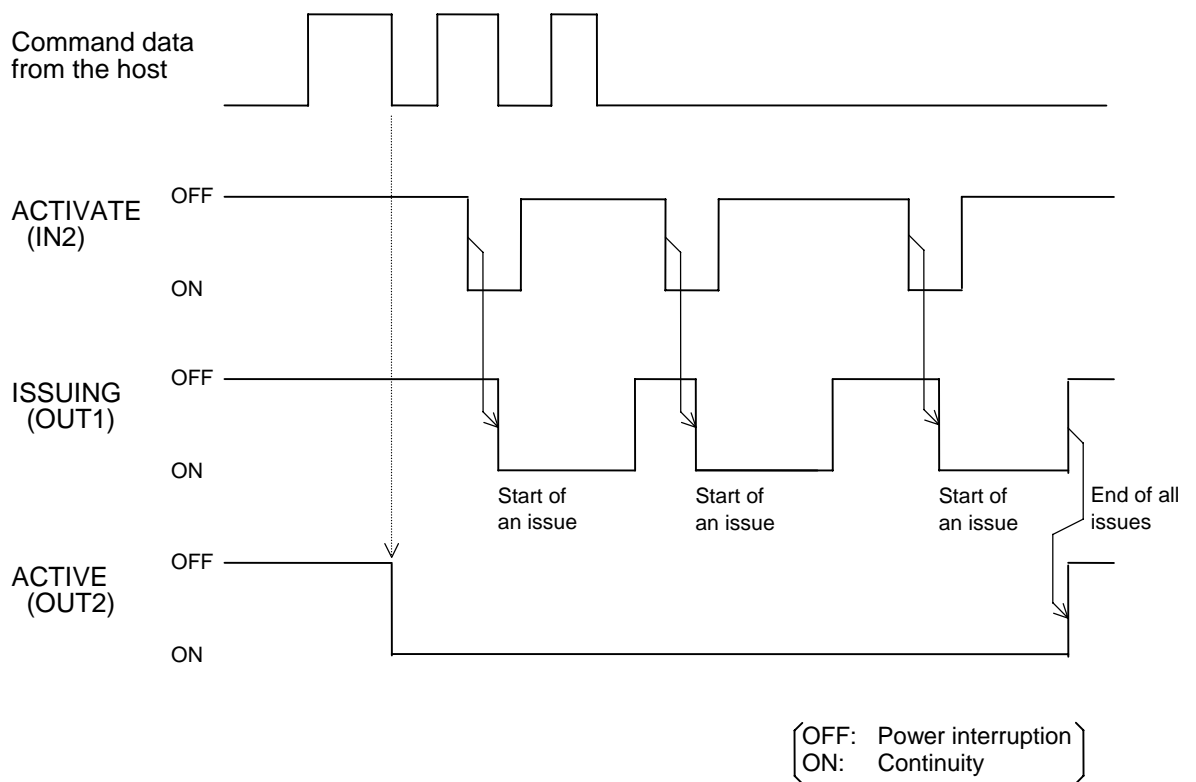
NOTE: While a label is being issued by the ISSUE signal (IN1), a Clear Command or Drawing Command should not be sent from the host, since the data may not be printed properly.



The printer executes an Issue Command which has been sent from the host according to this signal. While the ACTIVATE signal is off, the printer does not issue a label. The printer starts executing the Issue Command sent from the host by an ON pulse of 80 msec or more. One ON pulse allows the printer to execute the process for one label in the received Issue Commands. However, the ACTIVATE signal input is ignored, when the printer is in any of the following states.

- Issuing
- Feeding
- Inactive
- Engine error
- Ejecting
- Manual feeding
- Checking for print head broken dots
- Command save mode
- Writable character store mode
- Communication error (command error, hardware error)
- System mode
- Performing a pre-backfeed

When the printer is in a state after a pre-backfeeding, it feeds the label for the length of a pre-backfeed and issues one label (+ feeds the label to the stop position for strip issue.)

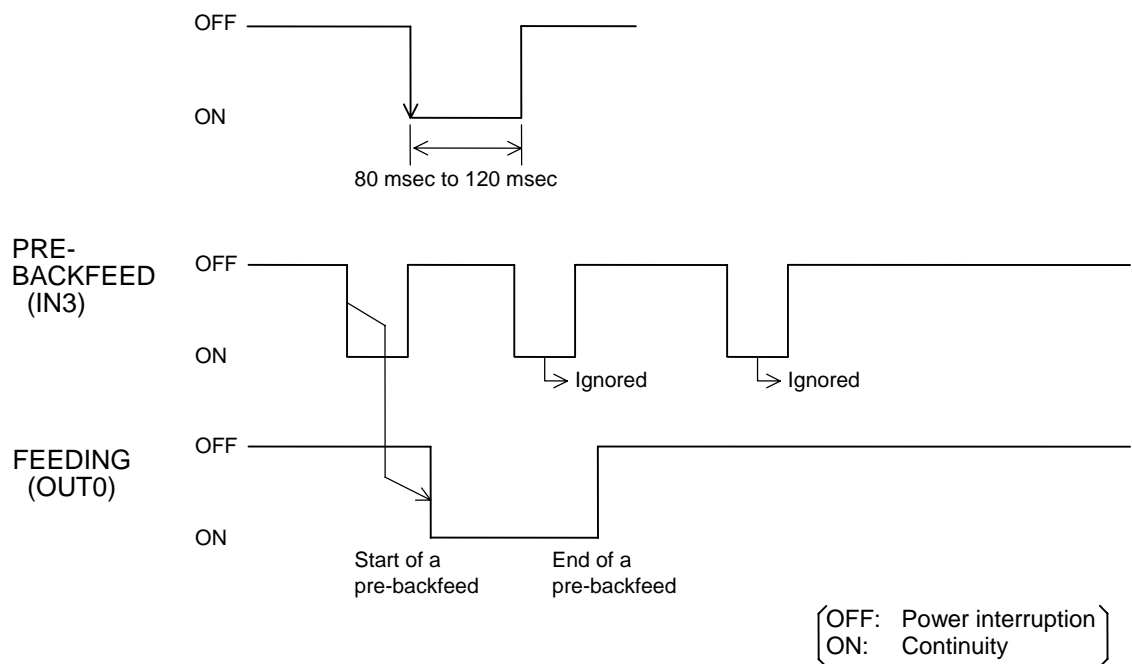


When the strip issue mode for auto labeler (Issue mode D or E) is selected, the printer feeds a label back to the home position when this signal goes from off to on.

The PRE-BACKFEED signal input is ignored when the printer is in any of the following states.

- Issuing
- Feeding
- Engine error
- Ejecting
- Manual feeding
- Checking for print head broken dots
- Command save mode
- Writable character store mode
- Communication error (command error, hardware error)
- System mode
- Performing a pre-backfeed

While the label is at the home position by a pre-backfeeding, the subsequent PRE-BACKFEED signals are ignored.



This output signal indicates that the printer is feeding a label.

The signal is on during a feed. Feeding means the following states.

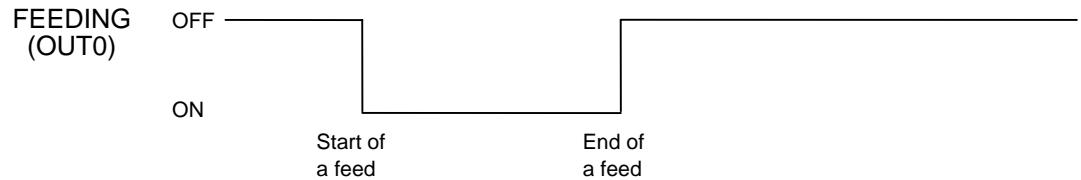
- Normal feeding
- Ejecting by the Eject Command from the host
- Ejecting for a cut issue
- Reverse feeding for a strip issue mode for auto labeler
- Manual forward/reverse feeding
- Initial feed when the printer restarts after an error is cleared.
- Performing a pre-backfeed

When the printer completes a feed normally, the signal goes off.

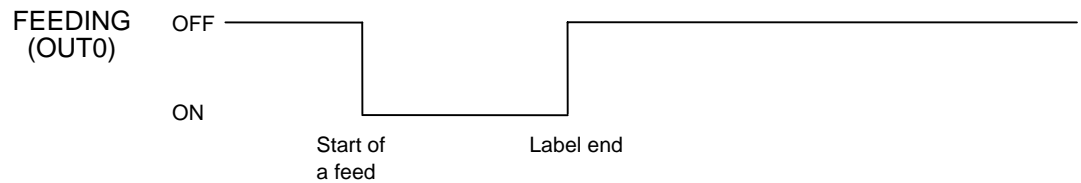
The FEEDING signal is output for a feed by any of the following: the [FEED] key, a command from the host, or the FEED signal.

When an error occurs during a feed and the printer stops feeding, the FEEDING signal goes off.

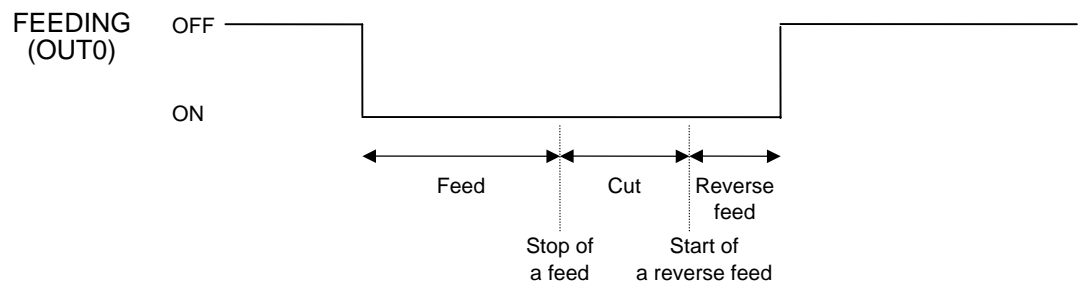
(1) Normal feed



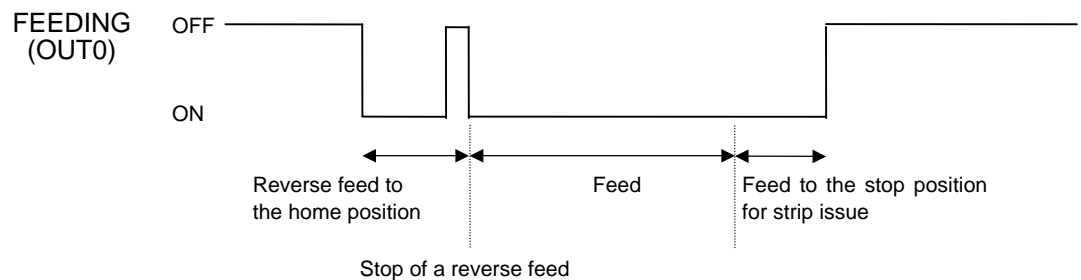
(2) Label end in the middle of a feed



(3) Feed with a cut



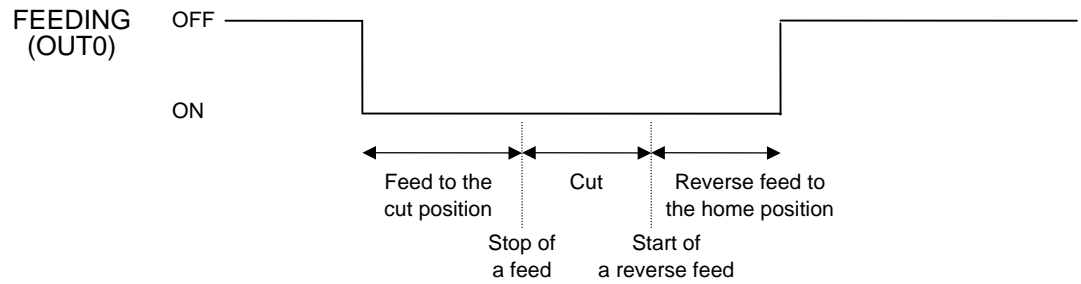
(4) Feed to the stop position for strip issue



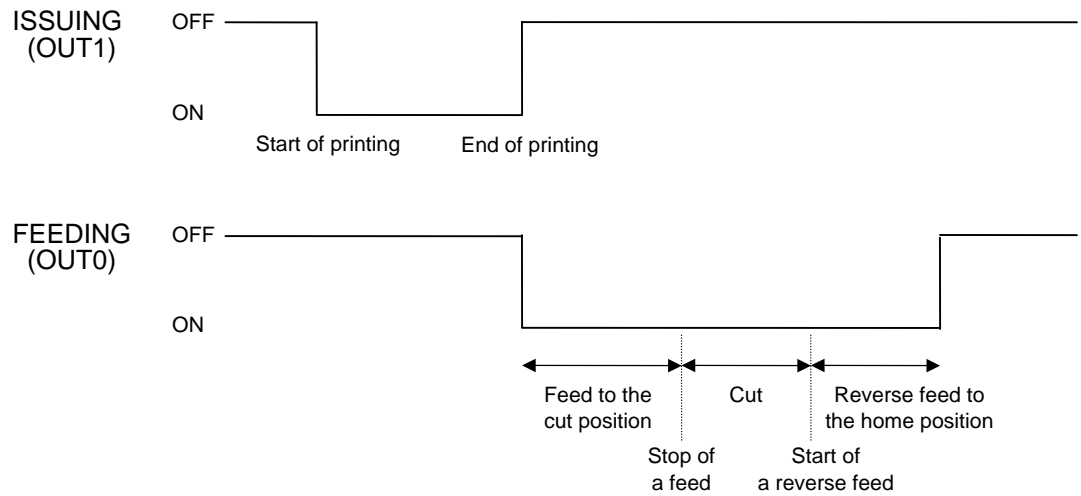
(OFF: Power interruption)
(ON: Continuity)

(5) Ejection

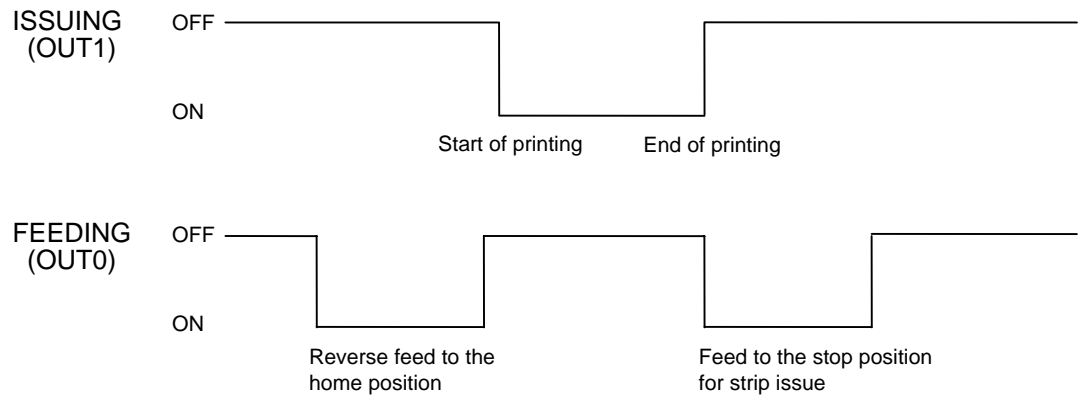
[In-line]



(6) Issue with a cut



(7) Strip issue mode for auto labeler



(OFF: Power interruption)
(ON: Continuity)

This output signal indicates that the printer is issuing a label.
The signal is on during an issue.

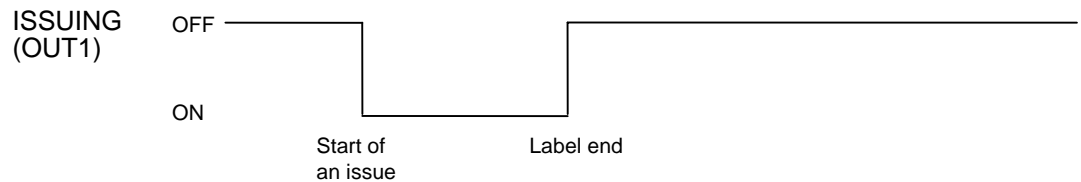
The ISSUING signal is output for any issue such as the self test results printout or test print in the system mode, or by a command from the host or the ISSUE signal. However, there may be moments where all output signals go on because the checks including the Expansion I/O loop back check are performed in the self-test.

When an error occurs during issuing and the printer stops issuing, the ISSUING signal goes off.

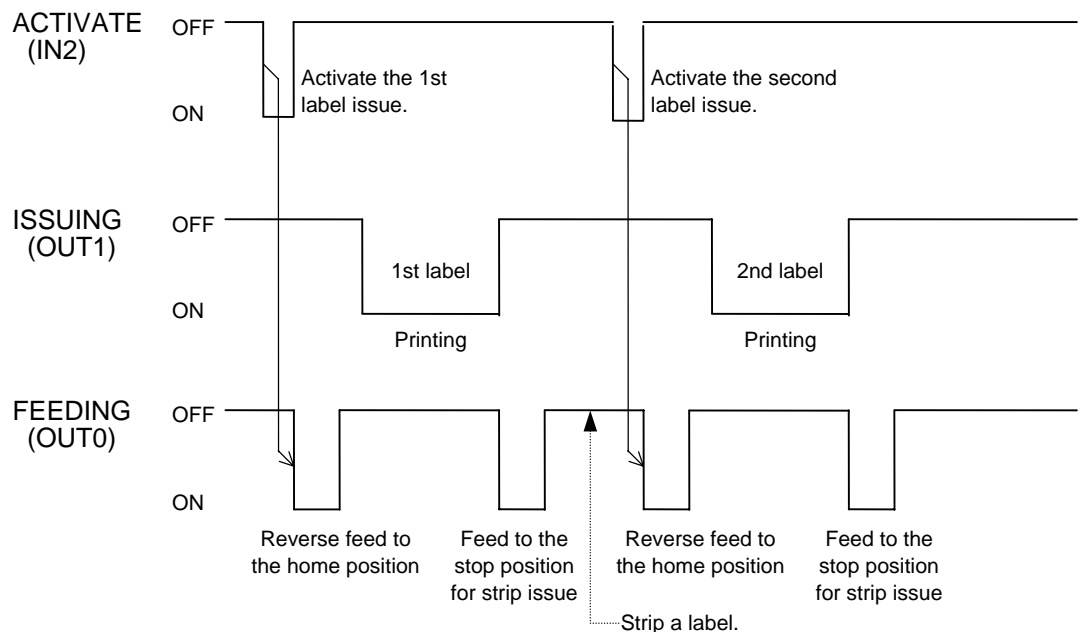
(1) Normal issue



(2) Label end in the middle of an issue



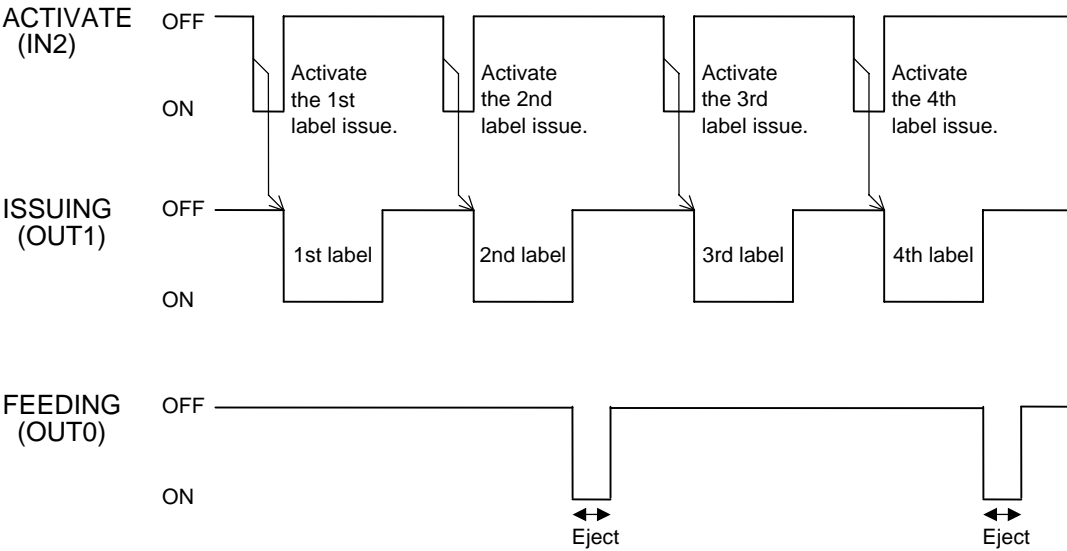
(3) Strip issue mode for auto labeler (2 labels to issue)



(OFF: Power interruption)
(ON: Continuity)

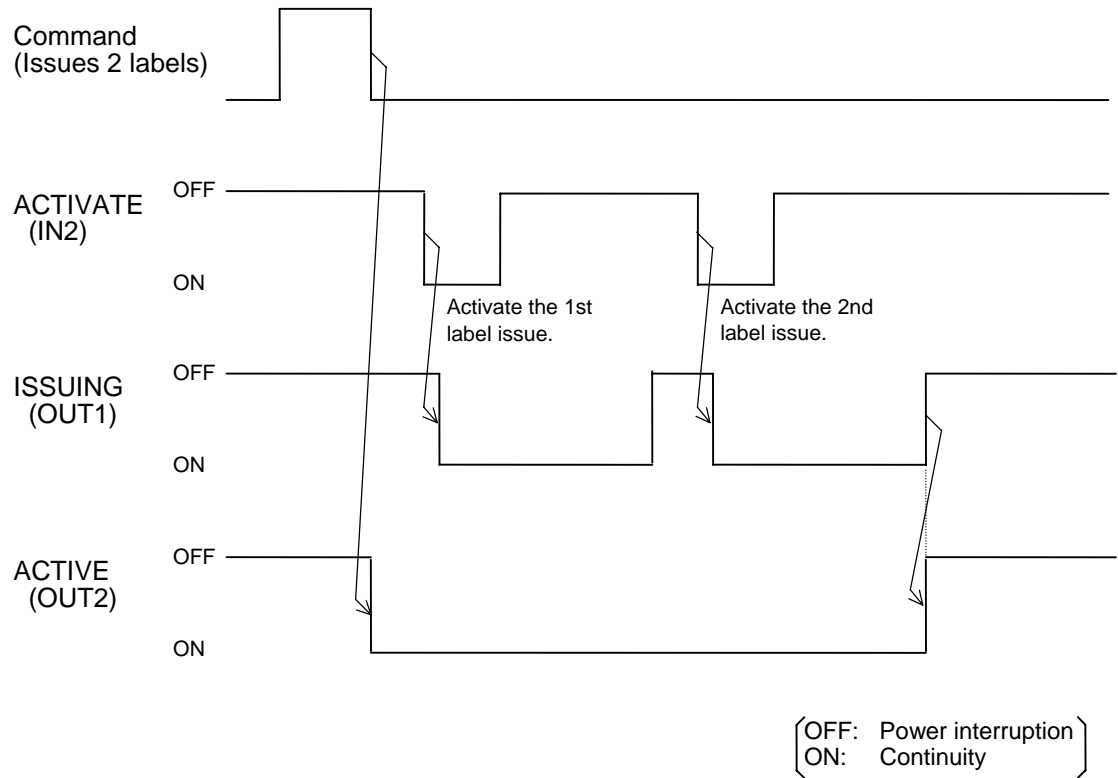
(4) Cut issue (4 labels to issue, cut every 2 labels)

[In-line]



This output signal indicates that the printer is active.

When the printer receives a Feed Command or an Issue Command, the signal goes on (active). When the printer completes processing the all Feed Commands or Issue Commands sent from the host, the signal goes off (inactive).



This output signal indicates that an error occurred causing the printer to stop.

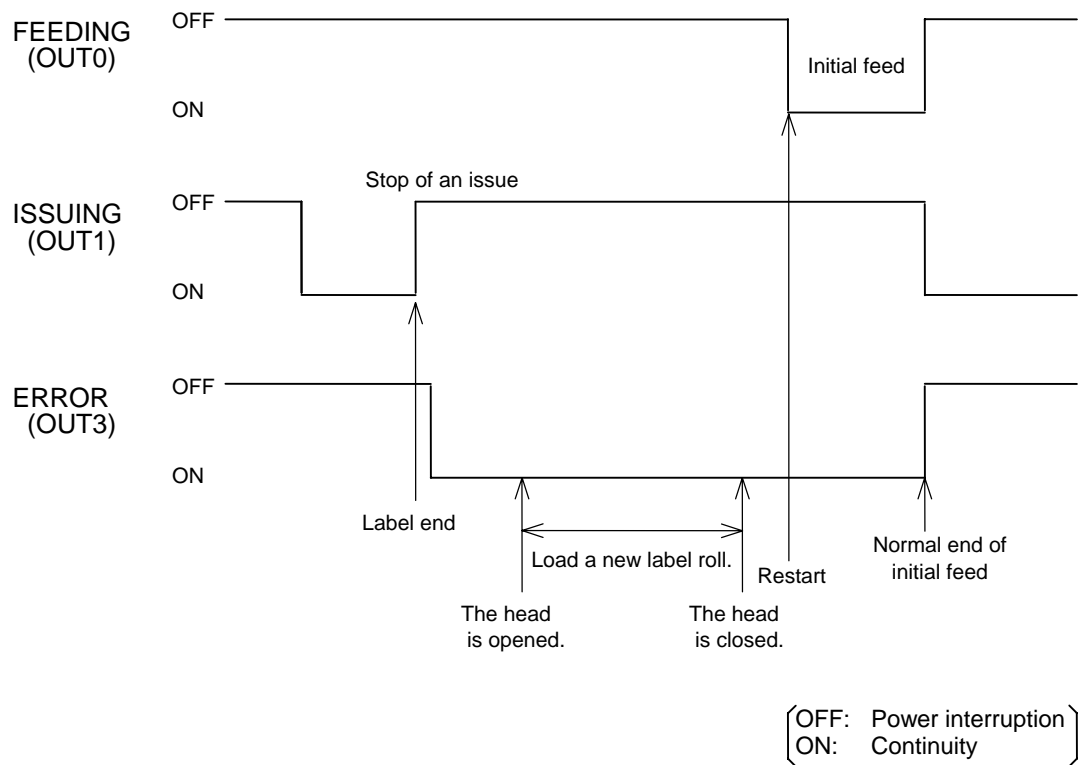
The signal goes on while the printer is in an error state.

When any of the following errors occur, the ERROR signal goes on.

- Communication error (Command error)
- Communication error (Hardware error)
- Paper jam
- Cutter error
- Paper end
- Ribbon error
- Head open error
- Thermal head error
- Thermal head overheating
- Writing error of the flash memory
- Erasing error of the flash memory
- Insufficient free space of the flash memory

When the error state is cleared, the ERROR signal goes off.

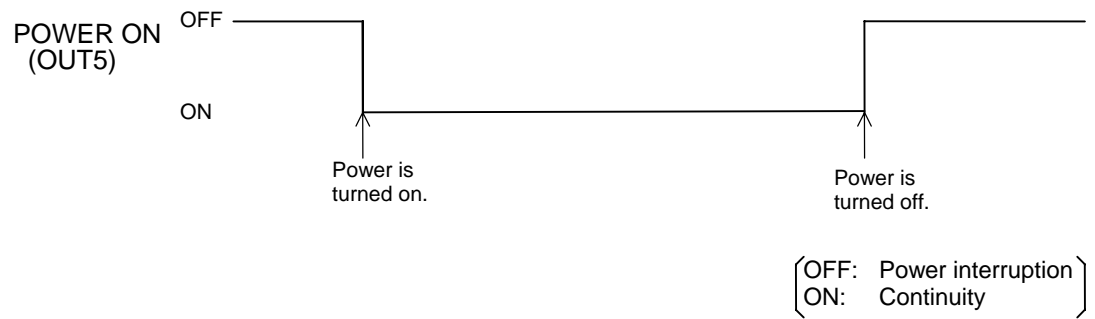
When an error cannot be cleared by pressing the [RESTART] key, the printer is not restored without turning the power off and on again.



This output signal indicates that the printer power is on.

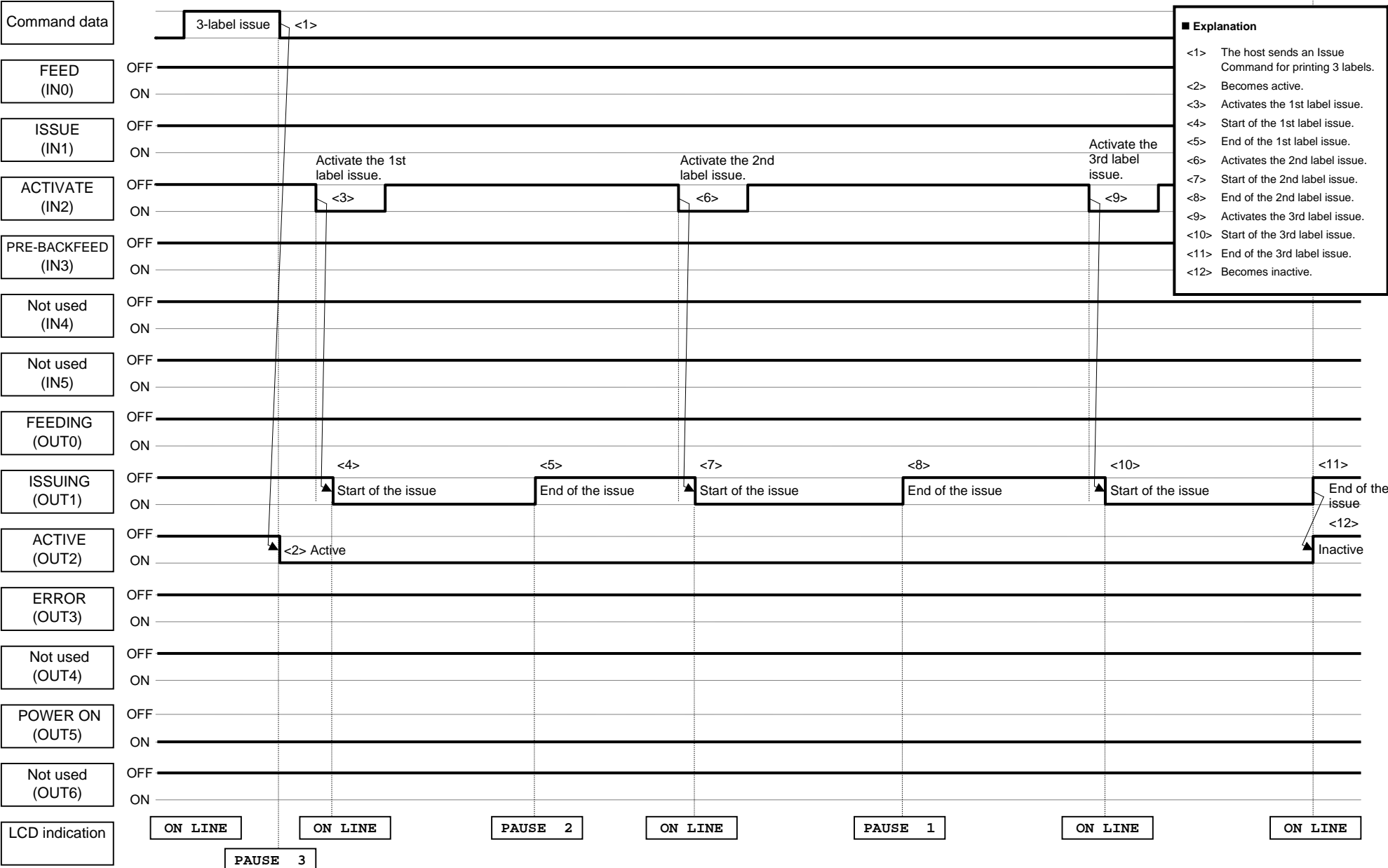
While the printer power is on, the signal is on.

While the printer power is on, the POWER ON signal remains on no matter what state the printer is in.

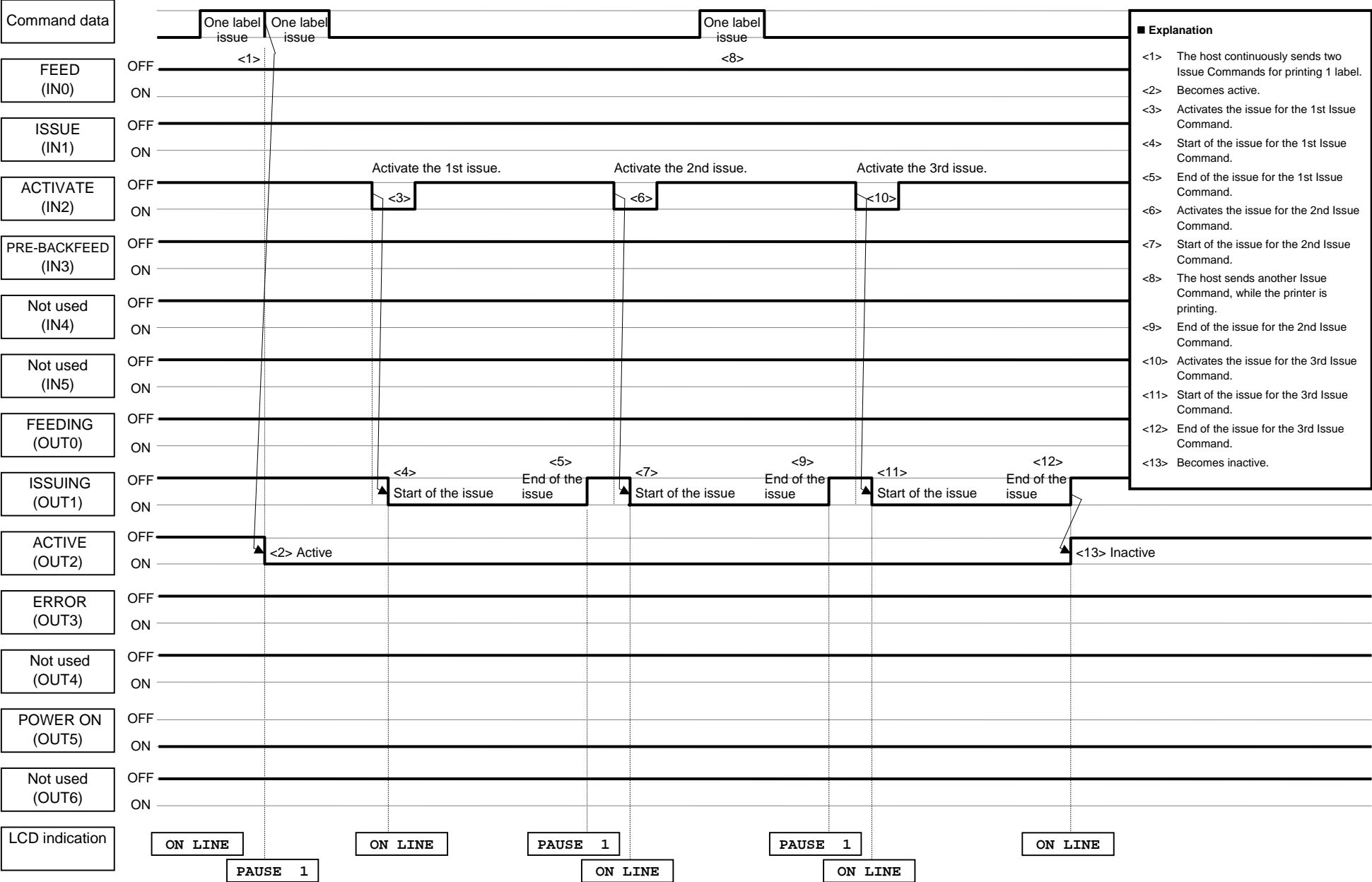


4.2.3 EXAMPLE OF TIMING CHART (IN-LINE SPECIFICATIONS)

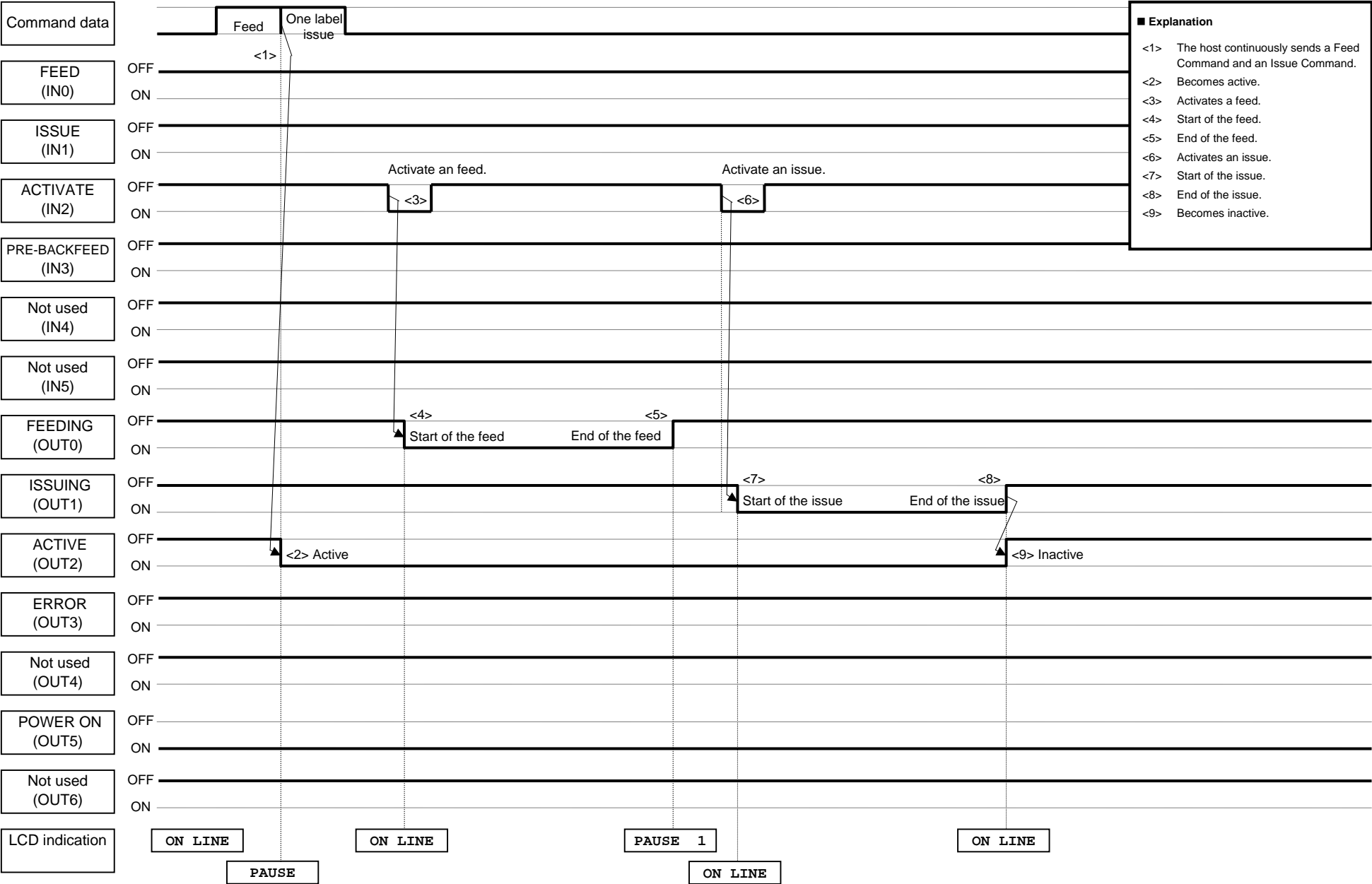
(1) When an Issue Command (for printing 3 labels) is sent.



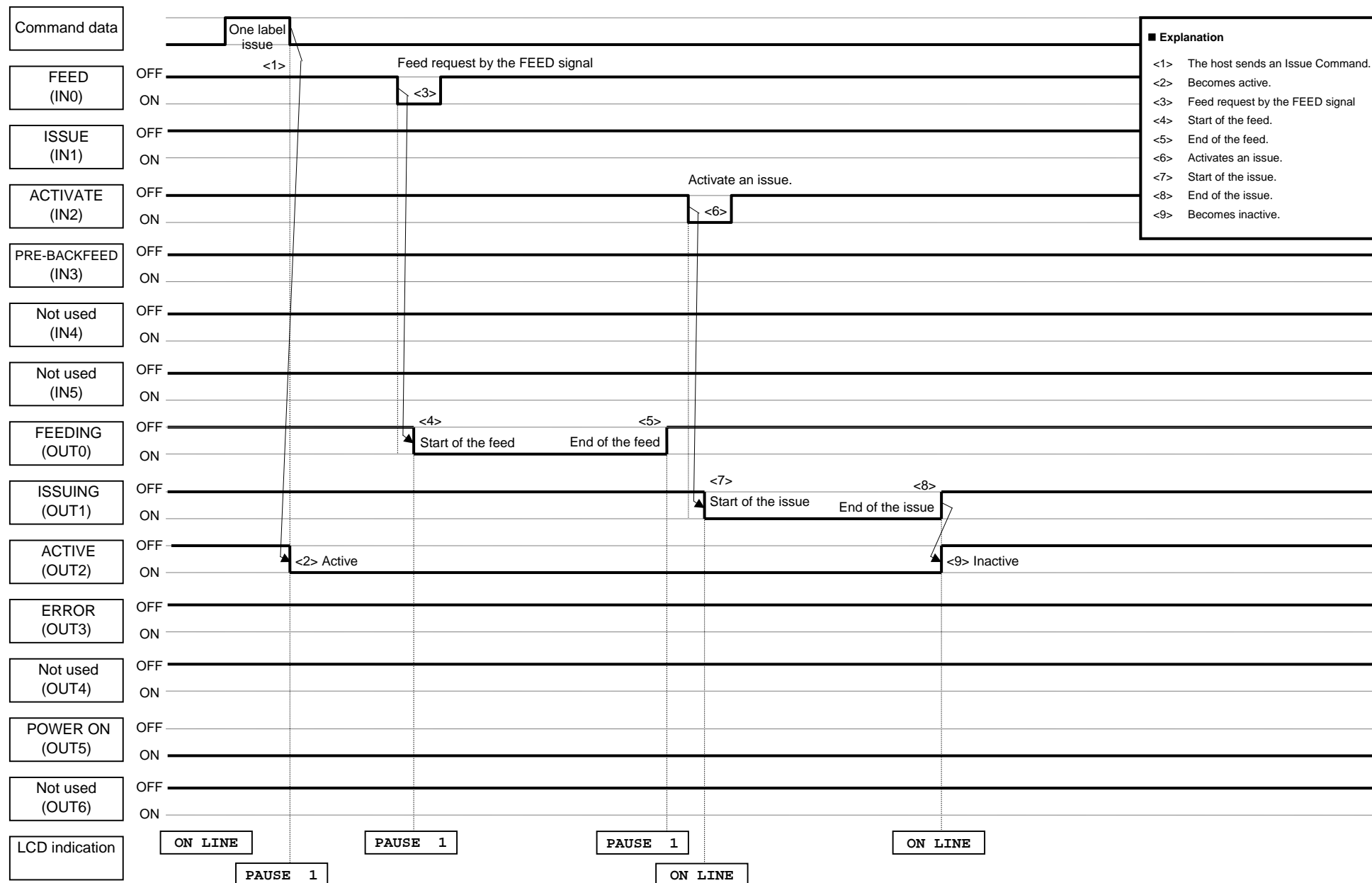
(2) When another Issue Command is sent during printing.



(3) When a Feed Command and an Issue Command are continuously sent.



(4) When a feed is performed by the FEED signal during the active state.



(5) When a paper end error occurs during printing.

