

4.7 High-Speed Counter

This section describes the high-speed counter for counting high-speed pulses from devices such as rotary encoders and proximity switches.

● Feature Description

The high-speed counter is a function that counts high-speed pulses which cannot be read in the execution of a normal ladder program or FBD program. The high-speed counter has a comparator function to compare the current value and a preset value (target value). When the current value and the preset value match, an external output is turned on or an interrupt program is executed. However, the interrupt program can only be used when ladder program is selected as the programming language.

The high-speed counter has a single-phase high-speed counter and a two-phase high-speed counter.

To use the high-speed counter, function area settings, data registers, special internal relays, and special data registers must be configured.

To use the high-speed counter, the following settings are required.

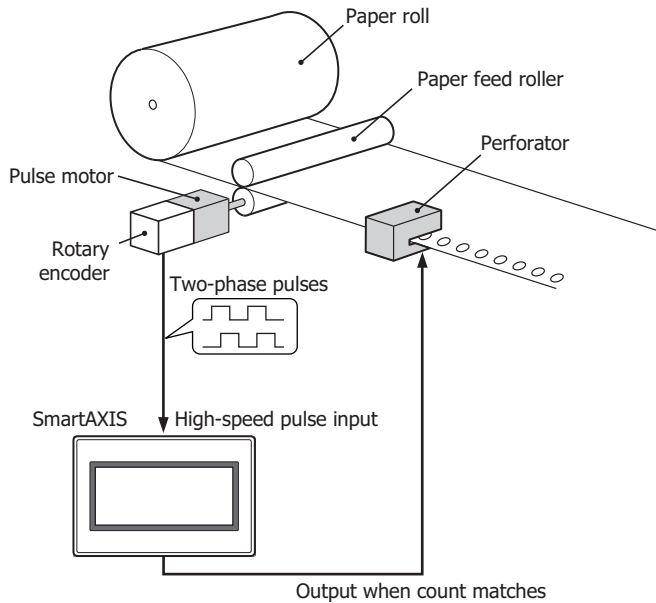
- Ladder program: WindLDR function area settings and settings for data registers, special internal relays, and special data registers
- FBD program: WindLDR function area settings and high-speed counter function block (HSC FB) settings
For details on the HSC FB, refer to Chapter 18 "The special FB" - "HSC (High-speed Counter)" in the "SmartAXIS FBD Programming Manual".

Application example

This application example punches holes into a roll of paper at a regular interval.

The two pulses (A-phase, B-phase) that carry the phase difference output from the rotary encoder are counted by the Touch two-phase high-speed counter.

When the current value reaches the preset value, the specified external output turns on and the perforator punches a hole in the roll of paper.



High-speed counter operation modes

The high-speed counter has the following two operation modes.

- Single-phase high-speed counter
- Two-phase high-speed counter

High-speed counting modes

The high-speed counter has the following three counting modes.

- Adding counter (single-phase high-speed counter)
- 2-edge count (two-phase high-speed counter)
- 4-edge count (two-phase high-speed counter)

Example: The input allocation when external input group 1 is specified as a two-phase high-speed counter

External input	I0	I1	I2
	↓	↓	↓
High-speed counter	A-phase	B-phase	External clear input (Z-phase)

● **High-speed Counter External Inputs**

The 12-I/O type can only use a maximum of four single-phase high-speed counters and a maximum of one dual-phase high-speed counter.

■ **Single-phase high-speed counter**

The 12-I/O type cannot use external inputs I0 and I1 as single-phase high-speed counters.

Group	1		2	3	4	5
External input	I0	I1	I2	I3	I4	I5
Single-phase high-speed counter	–	–	Pulse input	Pulse input	Pulse input	Pulse input

■ **Two-phase high-speed counter**

External inputs I0/I1 (group 1) can be used as two-phase high-speed counters. External inputs I2 can be used as external clear inputs for group 1. In this situation, external inputs I2 cannot be used as single-phase high-speed counters.

Group	1		2	3	4	5
External input	I0	I1	I2	I3	I4	I5
Two-phase high-speed counter	Pulse input (A-phase)	Pulse input (B-phase)	External clear input*1 (Z-phase)	–	–	–

*1 If not used as the external clear input (Z-phase), group 2 can be used as single-phase high-speed counters.

● High-Speed Counter Operation

The high-speed counter turns on an external output or executes an interrupt program when the current value matches the preset value (target value).

The high-speed counter has two operation modes, single-phase high-speed counter and two-phase high-speed counter.

For how to configure the function to turn on an external output, refer to "Comparison Actions" on page 3-59.

■ Single-phase high-speed counter

Group 2, group 3, group 4, group 5 single-phase high-speed counter

- These groups only support adding counter.
- These groups support 10 kHz maximum pulse input and are capable of counting from 0 to 4,294,967,295 (32 bits).
- When the current value and the preset value match or an overflow occurs, an external output turns on or an interrupt program is executed.
- These groups only support the reset input via a special internal relay. When the reset is executed, the current value returns to the reset value specified by the special data registers.

Counting mode	Frequency
Adding counter	Group 2, 3, 4, 5: 10 kHz

■ Two-phase high-speed counter

Group 1 two-phase high-speed counter

- The two-phase high-speed counter counts by the phase difference between the A-phase and B-phase pulse input.
- These groups support 5 kHz maximum pulse input and are capable of counting from 0 to 4,294,967,295 (32 bits).
- Even higher speed counting is possible by specifying 2-edge count or 4-edge count.
- When the current value and the preset value match or an overflow or underflow occurs, an external output turns on or an interrupt program is executed.
- These groups support resetting the current value by the reset special internal relay or external clear input (Z-phase). When the reset is executed, the current value returns to the reset value specified by the special data registers.

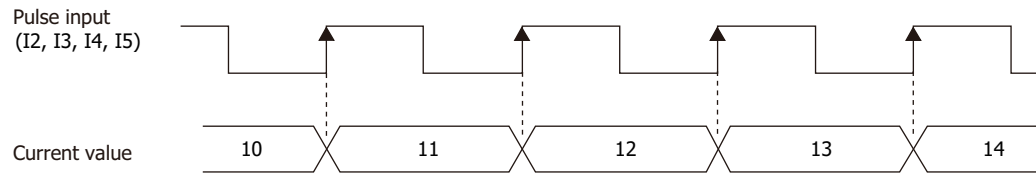
Group	Frequency
Group 1	2-edge count: 5kHz
	4-edge count: 2.5kHz

● Counting mode

The high-speed counter has the following three counting modes.

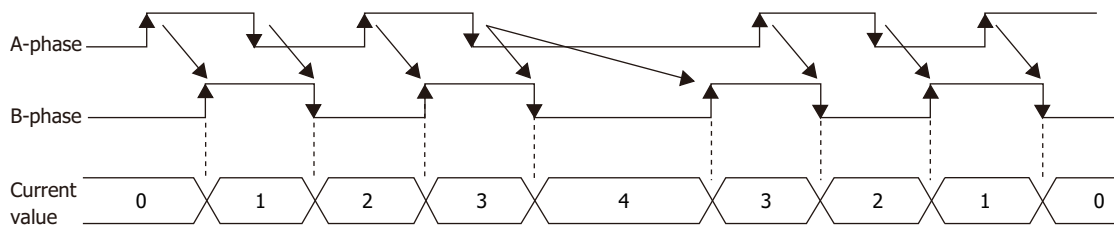
■ Adding counter (single-phase high-speed counter)

The adding counter counts up with the rise in pulse input.



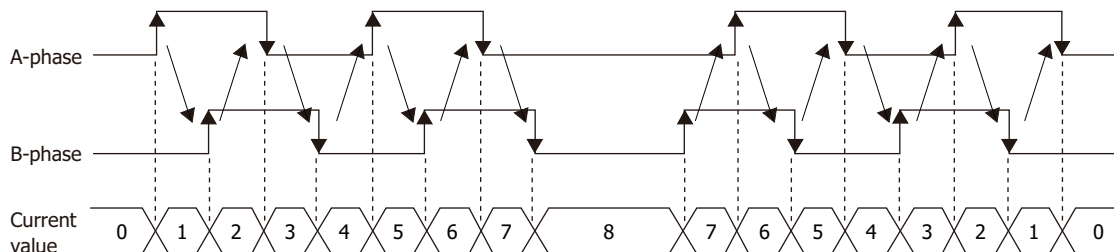
■ 2-edge count (two-phase high-speed counter)

This counter counts by the phase difference between A-phase and B-phase pulse input. When A-phase precedes B-phase, the counter counts up with the rise and fall of B-phase. When B-phase precedes A-phase, the counter counts down with the rise and fall of B-phase.



■ 4-edge count (two-phase high-speed counter)

This counter counts by the phase difference between A-phase and B-phase pulse input. When A-phase precedes B-phase, the counter counts up with the rise and fall of A-phase and B-phase. When B-phase precedes A-phase, the counter counts down with the rise and fall of A-phase and B-phase.



● Comparison Actions

The operating condition when comparing values is configured in the WindLDR **High-speed Counter Settings**, under **Comparison Action**.

The action when comparing values is **Comparison Output** or **Interrupt Program**, so specify an external output number or label number when comparing. However, the interrupt program can only be used when ladder program is selected as the programming language.

Operation

When the preset value and the current value are compared and the values match, the specified output is turned on or the interrupt program is executed.

A maximum of six high-speed counter preset values can be configured. For one preset value, the current value is compared with the same preset value each time.

When multiple preset values are configured, the preset value is changed each time the current value and preset value match.

For example, if four preset values are configured, when preset value 1 matches the current value, the comparison subject changes to preset value 2 → 3 → 4 in order.

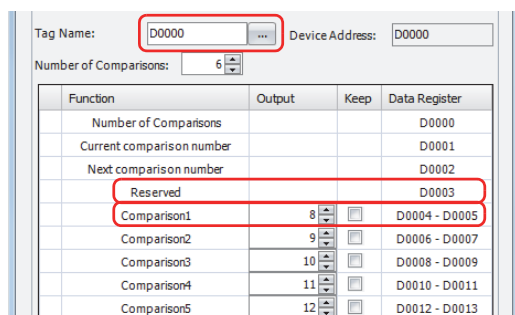
When the final preset value 4 matches the current value, the preset value returns to preset value 1 and the values are compared.

■ Preset value storage locations

The preset values during high-speed counter operation are stored as 2 words in special data registers.

Group	1 (I0 to I1)	2 (I2)	3 (I3)	4 (I4)	5 (I5)	Read/Write
Preset Value (Upper word)	D8052	D8058	D8070	D8136	D8142	R/W
Preset Value (Lower word)	D8053	D8059	D8071	D8137	D8143	

Specify the data registers to store the preset values in WindLDR and store those preset values in the ladder program or FBD program. Specify the starting address of the data registers to allocate the data registers to the individual settings in the comparison settings. When the high-speed counter is executed, the preset value with the number stored in **Current Preset Value Number** is active. The active preset value number for each comparison is stored in **Current Preset Value Number** and the next active preset value number is automatically stored in **Next Preset Value Number**. By changing the value of **Next Preset Value Number** in the ladder program or FBD program, the next active preset value number can be changed. The active preset value is stored for each group in the special data registers shown in the table above.

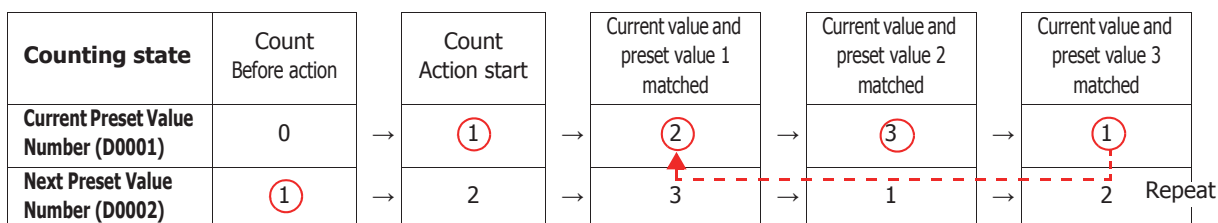


Example: Group 1, number of preset values is 3, set to device address D0000

When the current value matches preset value 1, **Current Preset Value Number** becomes 2 and 3 is stored in **Next Preset Value Number**.

When the device address is configured as D0000, **Current Preset Value Number** is stored in D0001 and **Next Preset Value Number** is stored in D0002.

For the group 1 preset value, the value of the data registers (D0004, D0005) allocated to preset value number 1 is stored in D8052 and D8053 as shown in the table above and it is compared to the current value.



Before the count action, set the Next Preset Value Number and preset value 1 to 3 to the count values with the initialize pulse in ladder program or FBD program.

Preset value 1 is set to **Current Preset Value Number**

Preset value 2 is set.

Preset value 3 is set.

Once again, preset value 1 is set.



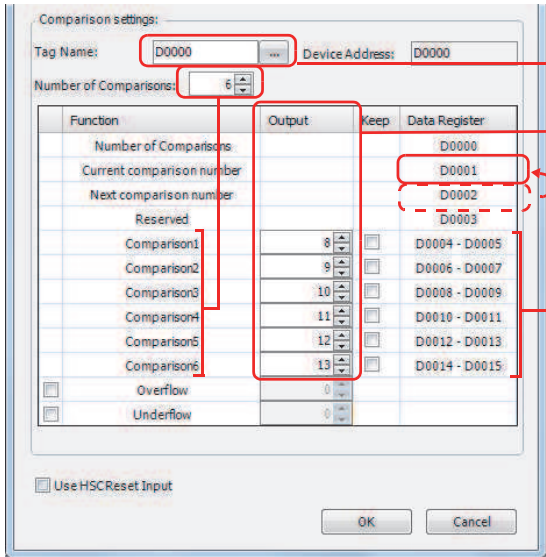
When the **Next Preset Value Number** preset value becomes active, the high-speed counter preset value during execution does not change, even when the preset value for that preset value number is changed. When the current value and the current preset value match, the preset value with the number stored in **Next Preset Value Number** becomes active. Changes to the **Next Preset Value Number** data register must be performed before the preset value becomes active.

Comparison operation flow

The comparison operation flow is as follows.

1 Start (Run) the Touch.

For the first scan, **Next Preset Value Number** is set to the number for preset value 1 with the initialize pulse.
For the second scan, an I/O refresh is performed in END processing and the value of **Next Preset Value Number** is transferred to **Current Preset Value Number**.
The content of **Next Preset Value Number** becomes the preset value n + 1 ("2" in this example).
When the number of preset values is 1, **Next Preset Value Number** is always "1".



The data register that stores the preset value (target value).
Specify the starting address.

The outputs (external outputs) when the values match.

Transfer

The preset value with the number that became active is
the comparison subject with the current value and is
stored in the special data registers.

Example: For group 1
Storage destination for the preset value that became active.
Stored by group.

Group	Group 1 (I0 to I1)	Read/Write
Preset Value (Upper word)	D8052	R/W
Preset Value (Lower word)	D8053	

2 Start the high-speed counter count operation.

Turn on the gate input to start the count operation.

3 Compare the **Current Preset Value Number** preset value and the current value. When the current value and the preset value match, the next number for the preset value becomes active and the high-speed counter continues counting.

Execute **Comparison Output** or **Interrupt Program**. (**Comparison Output** in this example)

- Turn on the comparison (special internal relay) for only one scan.
- Overwrite **Current Preset Value Number** with **Next Preset Value Number** and start the count with the preset value for **Current Preset Value Number**.
- Add 1 to **Next Preset Value Number**.

4 When the procedure is executed up to preset value 6, repeat again from the beginning with preset value 1.



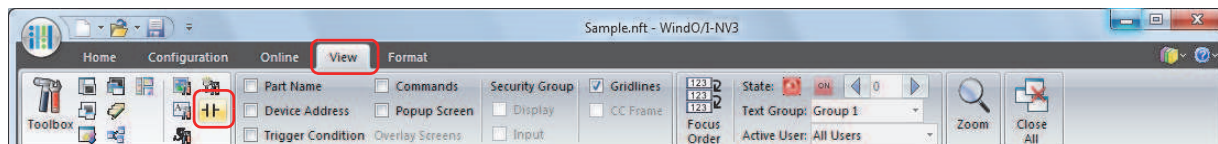
The **Current Preset Value Number** data register cannot be written to. It is read-only.
Next Preset Value Number and **Preset Value 1** to **Preset Value 6** can be read and written to.

● Procedure

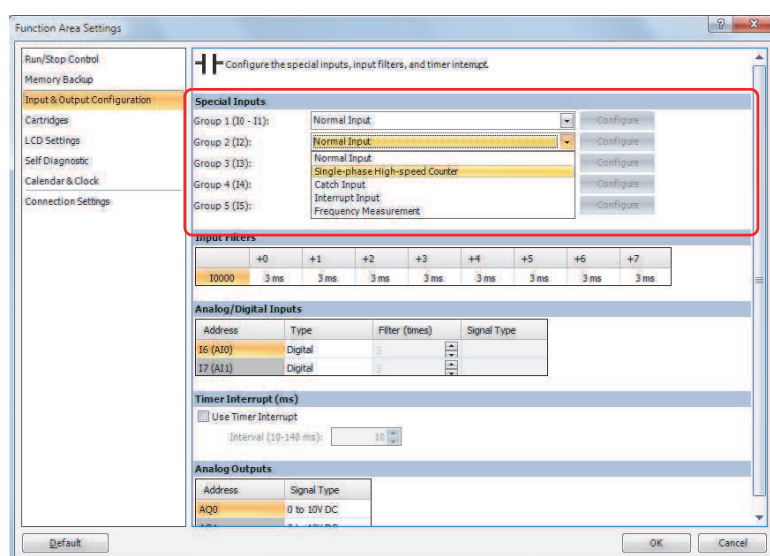
To use the high-speed counter, a normal input must be specified as **Two-phase High-speed Counter** or **Single-phase High-speed Counter** in the **Function Area Settings** tab. Inputs I0 to I7 on the Touch can be selected as normal input, high-speed counter, catch input, interrupt input, and frequency measurement.

When using normal input, catch input, interrupt input, or frequency measurement, high-speed counter cannot be used. The interrupt input can only be used when ladder program is selected as the programming language.

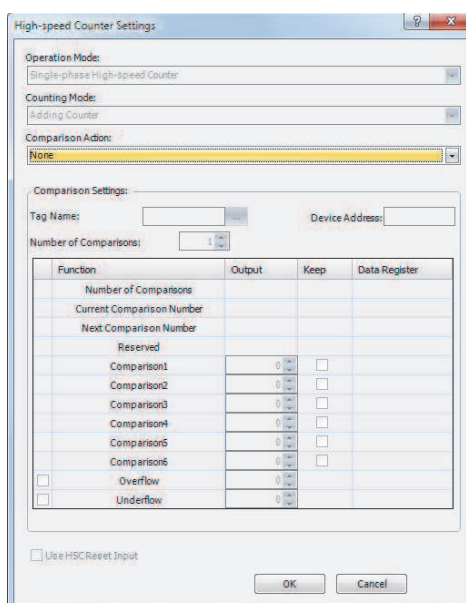
- 1 On the WindO/I-NV3 **View** tab, in the **Workspace** group, click  (Control Function). WindLDR starts.



- 2 On the WindLDR **Configuration** tab, in the **Function Area Settings** group, click **Input & Output Configuration**. The Function Area Settings dialog box is displayed.
- 3 Select **Two-phase High-speed Counter** or **Single-phase High-speed Counter** for the group to use the high-speed counter. The High-speed Counter Settings dialog box is displayed.



- 4 Configure the operation mode and the counting mode, and then click **OK**. To use comparison actions, configure the comparison settings.



- 5 Click **OK**. This concludes configuring the settings.

● Settings

■ Operation Mode

Inputs for group 2, group 3, group 4 and group 5 can only be used as single-phase high-speed counters. When group 1 is selected as the high-speed counter, group 2 (I2) can be used as clear input.

■ Counting Mode (single-phase high-speed counter)

The adding counter can only be used for group 2, group 3, group 4 and group 5 high-speed counters.

Adding Counter

The adding counter counts up with the rise in pulse input.

■ Counting Mode (two-phase high-speed counter)

When the two-phase high-speed counter is specified for **Operation Mode** for group 1, the counting mode can be selected as **2-edge count** or **4-edge count**. The two-phase counter cannot be used for the group 2, group 3, group 4 and group 5 high-speed counters.

2-edge count

This counter counts at double the frequency of the input pulse.

This counter counts by the phase difference between the A-phase and B-phase pulse input. When A-phase precedes B-phase, the counter counts up with the rise and fall of B-phase. When B-phase precedes A-phase, the counter counts down with the rise and fall of B-phase.

4-edge count

This counter counts at quadruple the frequency of the input pulse.

This counter counts by the phase difference between A-phase and B-phase pulse input. When A-phase precedes B-phase, the counter counts up with the rise and fall of A-phase and B-phase. When B-phase precedes A-phase, the counter counts down with the rise and fall of A-phase and B-phase.

■ Comparison Action

The comparison action is a function that compares the high-speed counter's current value with a preset value (target value).

It can use either the comparison output or an interrupt program. However, the interrupt program can only be used when ladder program is selected as the programming language.

- When **Comparison Output** is selected, the specified external output is turned on when the current value and the preset value match.
- When **Interrupt Program** is selected, the subroutine program with the specified label number is executed as the interrupt program when the current value and the preset value match.

Overflow and underflow can also be used for the comparison conditions.

For details on the comparison actions, refer to "Comparison Actions" on page 3-59.

■ Comparison Settings

When using the comparison output or the interrupt program as the comparison action for the high-speed counter, configure the external output number or the label number when there is a match. A maximum of six preset values can be specified for **Number of Comparisons** (preset value number 1 to 6).

Tag Name

Specify the Tag name which is allocated to the starting address of the data register region to store the preset values.

Device Address

Shows the address of the data register specified by the tag name.

Number of Comparisons

You can configure a maximum of six preset values (target values) for the comparison action.



- The preset value becomes active by the END processing in the second scan after the Touch starts operation. Store **Preset Value** in the data registers with initialize pulse M8120 input.
 - When the preset value (special data register) is changed before the comparison, the preset value currently being used for the comparison is discarded in the program's END processing, and the comparison is performed with the newly configured preset value.
-

Output

When a comparison action is selected, these are the external outputs specified for preset value 1 to 6.

The external outputs that can be used as comparison outputs are Q0 to Q3.

Overflow

Select this check box to use overflow in the comparison action conditions (when the current value exceeds 4,294,967,295).

Underflow

Select this check box to use underflow in the comparison action conditions (when the current value falls below 0).



When the comparison action is **Comparison Output** and either a preset value, overflow, or underflow has been enabled as a comparison condition, the text box to enter the comparison output is enabled. The comparison output can be specified for each of these match conditions.

■ **Keep**

After the current value matches the preset value, select to reset the current value to a reset value or to keep the value. Select this check box to keep the current value.

■ **Use HSC Reset Input**

Select this check box to reset the current value to a reset value with external input (high-speed counter reset input). High-speed counter reset input can only be specified for group 1.

Group	External input
Group 1	I2

When high-speed counter reset input is turned on, the current value is reset to a reset value.

If high-speed counter reset input is not used, I2 is normal input.

High-speed counter devices

The high-speed counter operates according to special internal relay and special data register settings. While the high-speed counter is operating, the current value, control output, and operating status value are reflected in the special internal relays and special data registers with each scan.

The high-speed counter start and stop control signals and the current value, preset values, and reset values are allocated to the special internal relays and special data registers.

Device allocation table

The devices used by the high-speed counter are as follows.

Special internal relay list

Group	1 (I0 to I1)	2 (I2)	3 (I3)	4 (I4)	5 (I5)	Read/Write
Comparison Output Reset	M8030	M8040	M8055	M8166	M8173	R/W
Gate Input	M8031	M8041	M8056	M8167	M8174	
Reset Input	M8032	M8042	M8057	M8170	M8175	
Reset Status	M8033	—	—	—	—	R
Comparison ON Status	M8034	M8043	M8060	M8171	M8176	
Overflow	M8035	M8044	M8061	M8172	M8177	
Underflow	M8036	—	—	—	—	
Count Direction Flag	M8037	—	—	—	—	

Special data register list

Group	1 (I0 to I1)	2 (I2)	3 (I3)	4 (I4)	5 (I5)	Read/Write
Current Value (Upper word)	D8050	D8056	D8068	D8134	D8140	R
Current Value (Lower word)	D8051	D8057	D8069	D8135	D8141	
Preset Value (Upper word)	D8052	D8058	D8070	D8136	D8142	R/W
Preset Value (Lower word)	D8053	D8059	D8071	D8137	D8143	
Reset Value (Upper word)	D8054	D8060	D8072	D8138	D8144	
Reset Value (Lower word)	D8055	D8061	D8073	D8139	D8145	

When using the devices above with instructions or FB where the data type unit can be specified, specify the data type as double word (D). When the 32-bit data storage setting in the function area settings is set to **from Lower Word**, the lower word is stored in the first device.

■ Start/stop high-speed counter

The high-speed counter can be started and stopped per group by turning the gate input on or off.

Group	1 (I0 to I1)	2 (I2)	3 (I3)	4 (I4)	5 (I5)	Read/Write
Gate Input	M8031	M8041	M8056	M8167	M8174	R/W

■ Current value storage locations

The current value for the single-phase high-speed counter is stored in special data registers as 2 words per group.

Group	1 (I0 to I1)	2 (I2)	3 (I3)	4 (I4)	5 (I5)	Read/Write
Current Value (Upper word)	D8050	D8056	D8068	D8134	D8140	R
Current Value (Lower word)	D8051	D8057	D8069	D8135	D8141	

When the 32-bit data storage setting in the function area settings is set to **from Lower Word**, the lower word is stored in the first device.

■ Comparison ON status

When the current value and the preset value match, the special internal relay turns on for only one scan.

Group	1 (I0 to I1)	2 (I2)	3 (I3)	4 (I4)	5 (I5)	Read/Write
Comparison ON Status	M8034	M8043	M8060	M8171	M8176	R

■ Overflow

When the current value exceeds 4,294,967,295, the special internal relay turns on for only one scan. When the current value overflows, it becomes 0.

Group	1 (I0 to I1)	2 (I2)	3 (I3)	4 (I4)	5 (I5)	Read/Write
Overflow	M8035	M8044	M8061	M8172	M8177	R

■ Underflow

When the current value falls below 0, the special internal relay turns on for only one scan. When the current value underflows, it becomes 4,294,967,295.

Group	1 (I0 to I1)	2 (I2)	3 (I3)	4 (I4)	5 (I5)	Read/Write
Underflow	M8036	—	—	—	—	R

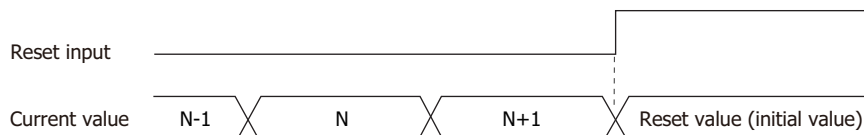
■ Comparison output reset

When the special internal relay turns on, the comparison output selected on **High-speed Counter Settings** turns off.

Group	1 (I0 to I1)	2 (I2)	3 (I3)	4 (I4)	5 (I5)	Read/Write
Comparison Output Reset	M8030	M8040	M8055	M8166	M8173	R/W

■ Reset input

When reset input is turned on, the current value returns to the reset value.



Group	1 (I0 to I1)	2 (I2)	3 (I3)	4 (I4)	5 (I5)	Read/Write
Reset Input	M8032	M8042	M8057	M8170	M8175	R/W

■ Preset value, reset value storage locations

The preset value and the reset value for the high-speed counter are stored in special data registers as 2 words.

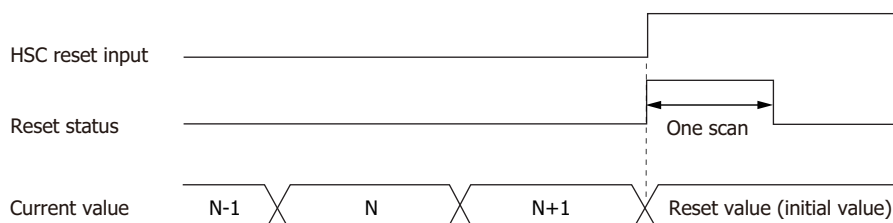
Group	1 (I0 to I1)	2 (I2)	3 (I3)	4 (I4)	5 (I5)	Read/Write
Preset Value (Upper word)	D8052	D8058	D8070	D8136	D8142	R/W
Preset Value (Lower word)	D8053	D8059	D8071	D8137	D8143	
Reset Value (Upper word)	D8054	D8060	D8072	D8138	D8144	
Reset Value (Lower word)	D8055	D8061	D8073	D8139	D8145	

When the 32-bit data storage setting in the function area settings is set to **from Lower Word**, the lower word is stored in the first device.

■ HSC reset input and reset status

When the HSC reset input is enabled in group 1, turn on HSC reset input I2 to return the current value to the reset value.

In this situation, reset status turns on for only one scan.



Group	1 (I0 to I1)	2 (I2)	3 (I3)	4 (I4)	5 (I5)	Read/Write
HSC Reset Input	I2	—	—	—	—	—
Reset Status	M8033	—	—	—	—	R

To use the reset input with group 1 single-phase high-speed counter, use I2 (group 2). When not using I2 as a reset input, it can be used as normal input, high-speed counters, catch input, interrupt input, or frequency measurements.

■ Count direction flag

These special internal relays maintain whether group 1 current value count is being added or subtracted.

When these special internal relays are on, they indicate addition. When they are off, they indicate subtraction.

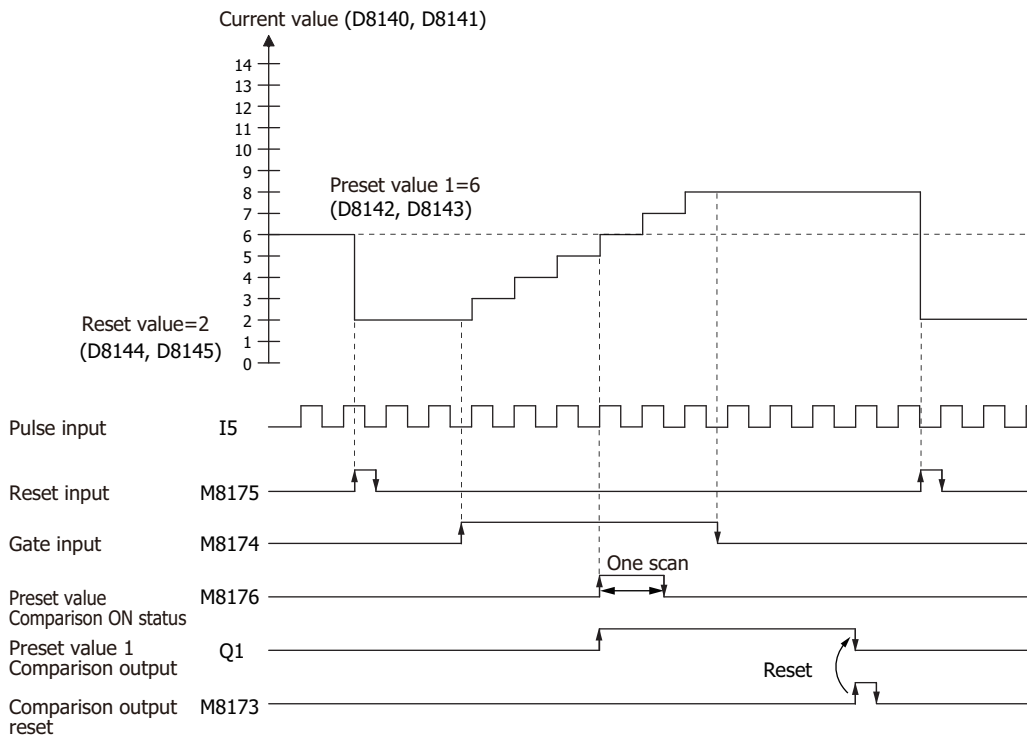
Group	1 (I0 to I1)	2 (I2)	3 (I3)	4 (I4)	5 (I5)	Read/Write
Count Direction Flag	M8037	—	—	—	—	R

● Timing chart 1

Single-phase high-speed counter (group 5) timing chart

Operating conditions

One preset value is used, and when the values match, output Q1 turns on and the current value is kept.
Overflow and underflow are not used.



- 1 When reset input (M8175) turns on, the reset value (D8144, D8155) is stored in the current value (D8140, D8141).
- 2 When gate input (M8174) turns on, the counting begins.
- 3 When the current value (D8140, D8141) and preset value 1 (D8142, D8143) match, the preset value 1 comparison output (Q1) and Comparison ON status (M8176) turn on. When the **Keep** check box is selected in the settings in the WindLDR **High-speed Counter Settings**, the current value is kept.
- 4 Q1 maintains the on state until comparison output reset (M8173) turns on. Preset value Comparison ON status (M8176) turns on for only one scan.
- 5 When the gate output turns off, counting stops.



High-speed counter usage precautions

The high-speed counter starts the count operation with the following two conditions.

- The Touch starts operation.
- The gate input is turned on.

To start the count operation, turn the gate input on from off when the Touch is running. When the gate input is already on when the Touch is stopped, the count operation starts when the Touch is switched from stop to run.

When a ladder program or FBD program is downloaded during the count operation, the count operation stops. The count operation will restart by setting the Touch to run.

● Timing chart 2

Two-phase high-speed counter (group 1) timing chart

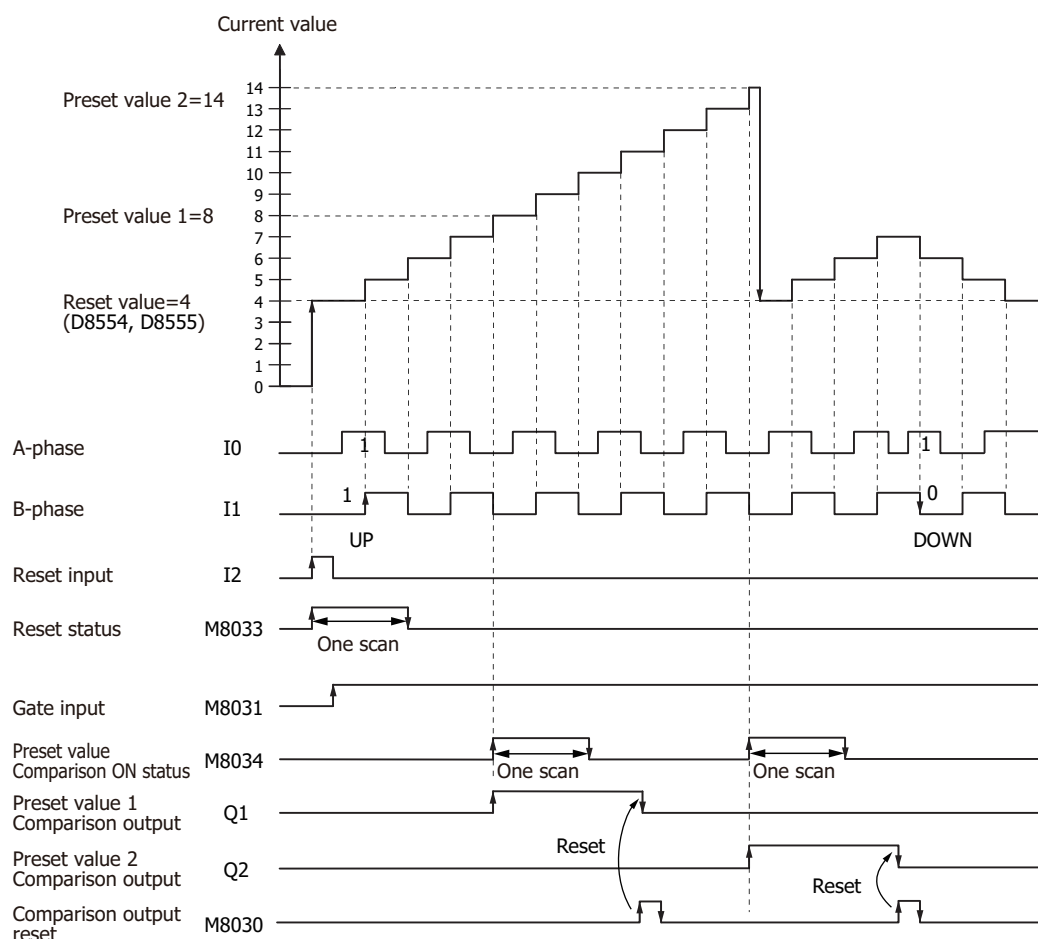
Operating conditions

The counting mode is set to **2-edge count** and reset input (I2) is used.

Two preset values are used, and when preset value 1 matches, output Q1 turns on and the current value is kept.

When preset value 2 matches, output Q2 turns on and the current value is cleared.

Overflow and underflow are not used.



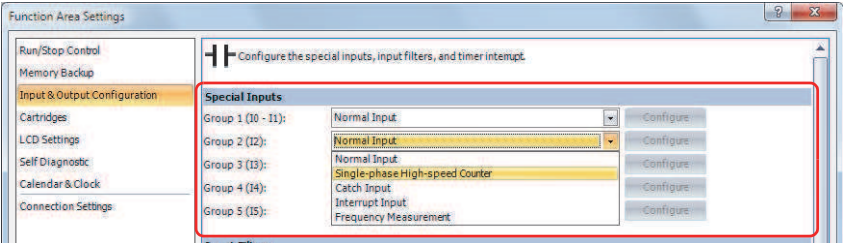
- 1 When reset input (I2) turns on, the reset value (D8054, D8055) is stored in the current value (D8050, D8051). In this situation, reset status (M8033) turns on for only one scan.
- 2 When gate input (M8031) turns on, counting begins.
- 3 When A-phase pulse (I0) precedes B-phase pulse (I1), the count goes up. When B-phase pulse (I1) precedes A-phase pulse (I0), the count goes down.
- 4 When the current value and preset value 1 (D8052, D8053) match, the preset value 1 comparison output (Q1) and setting value match (M8034) turn on. When preset value 1 matches, preset value 2 is stored in the preset value (D8052, D8053) as the new preset value and counting continues.
- 5 The preset value 1 comparison output (Q1) maintains the on state until comparison output reset (M8030) turns on. M8034 turns on for only one scan.

● Example 1

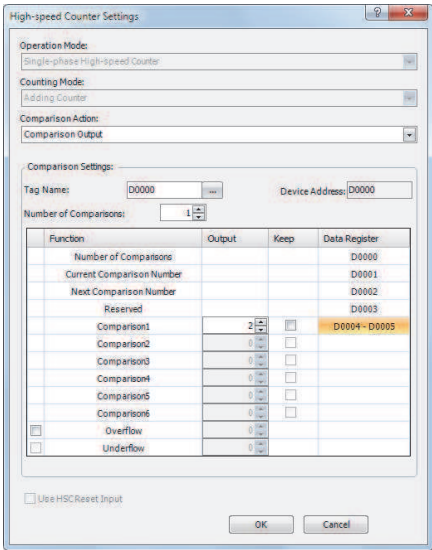
Using the single-phase high-speed counter in the ladder program, this example program turns on external output Q2 when 1,000 pulses are input.

Application description

When pulses are input to input I0 and the count reaches 1,000, output Q2 is turned on.
In the WindLDR **Function Area Settings**, select **Two/Single-phase High-speed Counter** for **Group 1**.



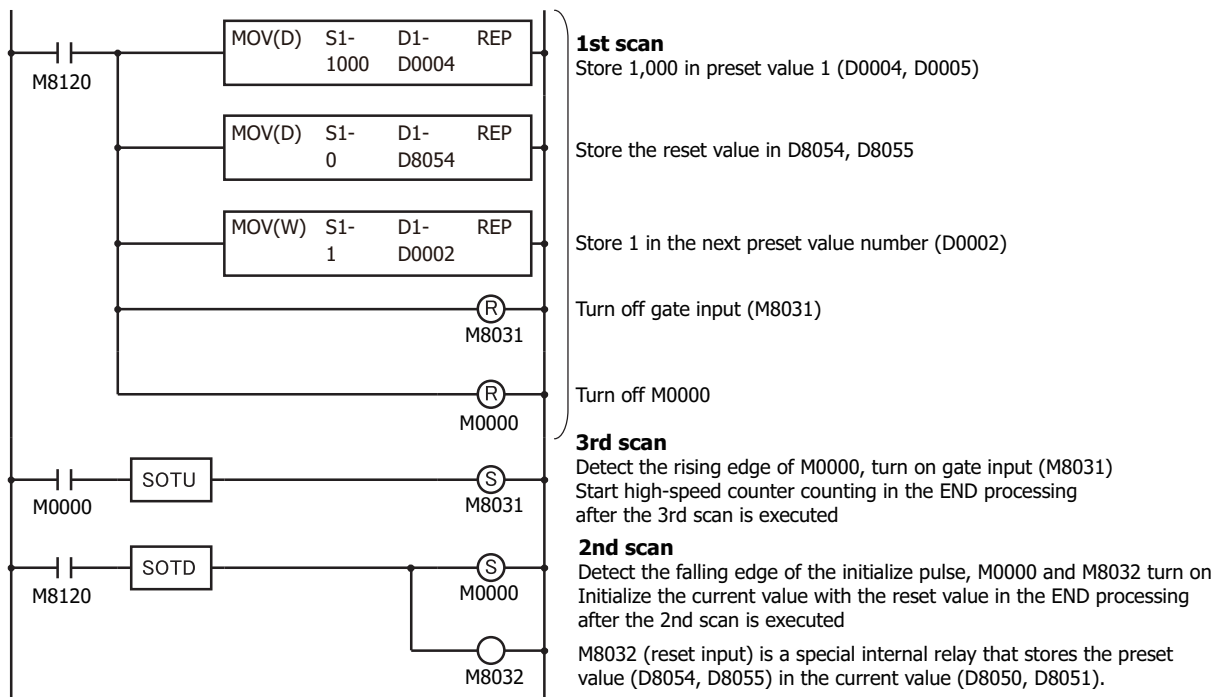
In **High-speed Counter Settings**, configure the settings as follows.



- External input : Group 2 (I2)
 - Operation Mode : Single-phase High-speed Counter
 - Counting Mode : Adding Counter
 - Comparison Action : Comparison Output
- Comparison Settings**
- Tag Name/Device Address : D0000 (data register)
 - Number of Comparisons : 1
 - Comparison output : Q2 (external output when matched)
 - Comparison1 (D4) : 0 (upper word)
 - Comparison1 (D5) : 1,000 (lower word)
 - Keep : Cleared
 - Reset value (D8054) : 0 (upper word)
 - Reset value (D8055) : 0 (lower word)
 - Overflow : Cleared
 - Underflow : Cleared
 - Use HSC Reset Input : Cleared

Ladder program

M8120 (initialize pulse) is a special internal relay that turns on for one scan when the Touch runs.

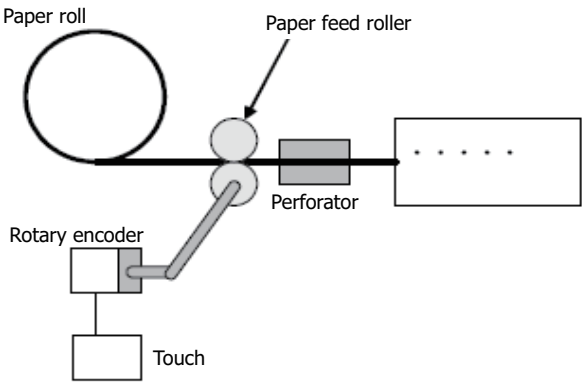


● Example 2

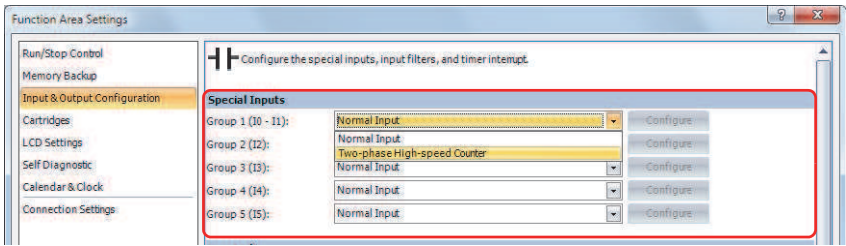
Using the two-phase high-speed counter, the pulses from a rotary encoder are input to the Touch and a continuous sheet of paper is marked (holes are punched) at a regular interval.

Application description

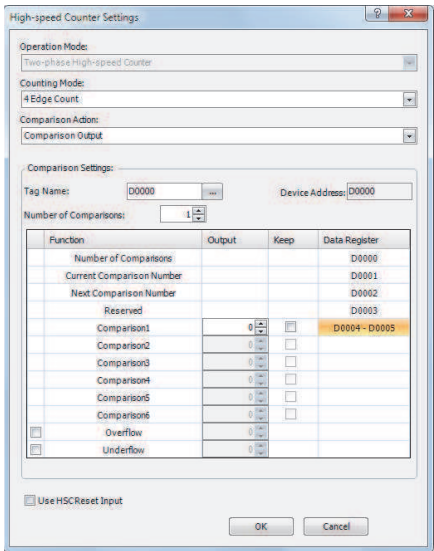
- The rotary encoder pulses are input to input I0. A continuous sheet of paper is marked (holes are punched) at a regular interval (every 2,700 pulses).
- The rotary encoder is directly connected to the paper feed roller, and output pulses are counted by the high-speed counter and controlled.
- The cycle time is the time to count 2,700 pulses. When the hole punch time is 0.5 seconds, the operation condition is 2,700 pulse count time > 0.5 seconds.



Select **Two-phase High-speed Counter** for **Group 1** in the **Input & Output Configuration** group on **Function Area Settings** tab.



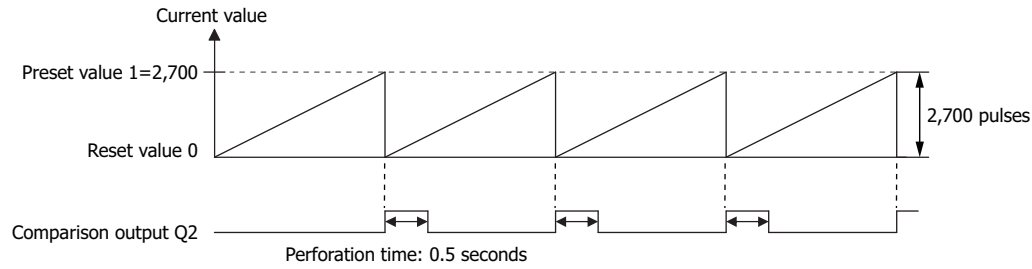
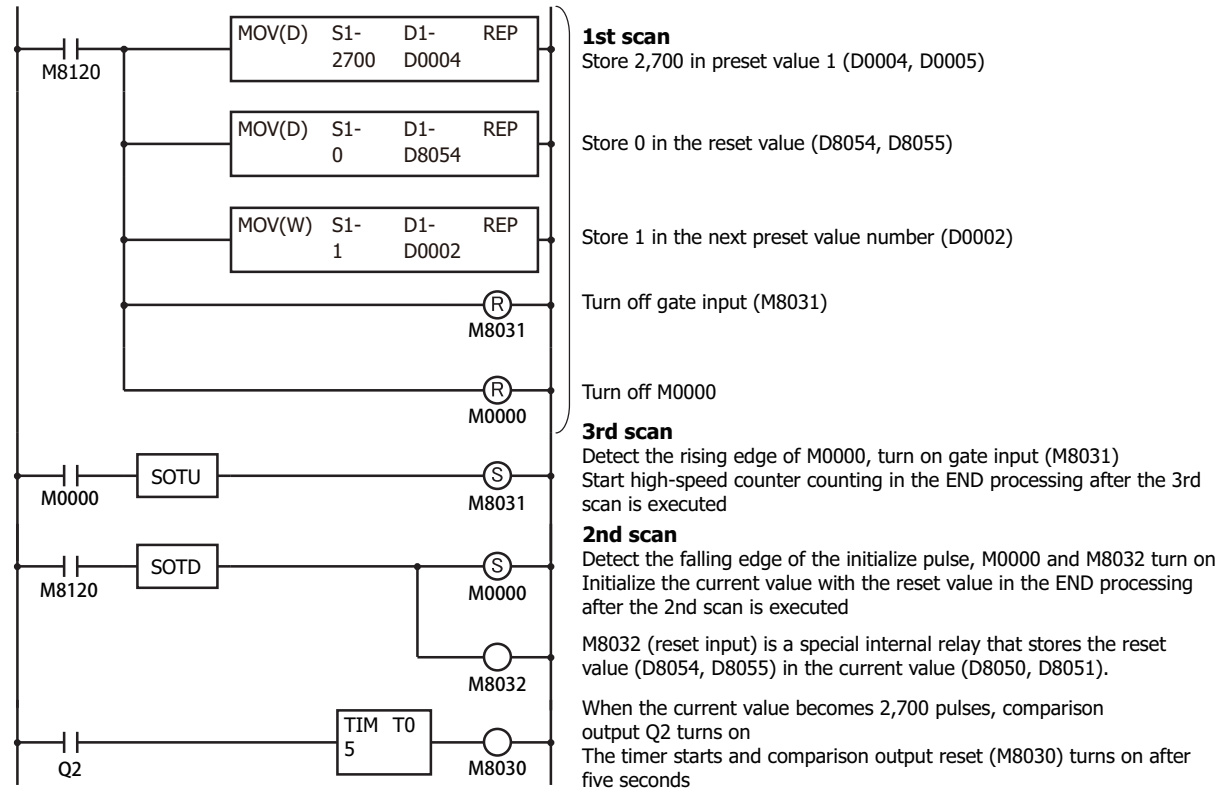
In **High-speed Counter Settings**, configure the settings as follows.



External input	: Group 1 (I0 to I1)
Operation Mode	: Two-phase High-speed Counter
Counting Mode	: 4 Edge Count
Comparison Action	: Comparison Output
Comparison Settings	
Tag Name/Device Address	: D0000 (data register)
Number of Comparisons	: 1
Comparison output	: Q2 (external output when matched)
Comparison1 (D0004)	: 0 (upper word)
Comparison1 (D0005)	: 2,700 (lower word)
Keep	: Cleared
Reset value (D8054)	: 0 (upper word)
Reset value (D8055)	: 0 (lower word)
Overflow	: Cleared
Underflow	: Cleared
Use HSC Reset Input	: Cleared

Program

M8120 (initialize pulse) is a special internal relay that turns on for one scan when the Touch runs.



In this example, Z-phase reset input is not used.