T-solution Leader in Electrics & Automation

User Manual

LS Programmable Logic Controller

High Speed Counter Module

G4F-HO1C
G4F-HD1C
G6F-HO1C
G6F-HD1C

Safety Instructions

- Read this manual carefully before installing, wiring, operating, servicing or inspecting this equipment.
- Keep this manual within easy reach for quick reference.

LS Industrial Systems

www.lsis.biz

Before Using the Product…

Before using the product, please read this user's manual thoroughly for the effective use of the product.

◈ Notices for the Safety ◈

- Notices for the Safety should be complied by the user to use the product safely and correctly to prevent the occurrence of any accident or danger.
- Notices is divided by 'Warning' and 'Caution' and each meaning is as follows ;

Warning

: in case of violating the instructions, it may cause the significant injury or death.

Caution

: in case of violating the instructions, it may cause the slight injury or product damage.

- The meaning of symbols used in the product and user's manual is as follows:

means "to take care as the danger may occur under the specific conditions".

means "to take care as the electric shock may occur under the specific condition".

- After using the user's manual, you should keep it in the place where the users can see it easily whenever they need.

o Notices in Design

Caution

- I/O Signal/Communication Cables shall be designed apart at least 100mm from high tension wire or power cable to avoid the influence caused by the noise and the change of magnetic field.
  It may cause the malfunction by the noise.
- Please take cares not to apply the lamp directly to the product in the place where lots of lamp are installed. The inflow of metal particle is not permitted as it may cause the malfunction of the product.
- In case of installation environment with metal particles, it may cause the malfunction and it is required not to flow into the metal particles when installing.

o Notices in Installation

Caution

- PLC should be used in the environment condition described in the general standard.
- If used out of general standard, it may cause the electric shock, fire, malfunction, damage of product or furious flames etc.
- Make sure that the module is fixed correctly.
- If the module is not installed correctly, it may cause the malfunction, failure or falling.

o Notices in Wiring

Caution

- The grounding of FG terminal should be used with the 3rd class grounding for PLC.
  If not grounding, it may cause the malfunction.
- The wiring in PLC should be connected after confirming the rating voltage of the product and terminal layout.
- If connected to the different power from the rating or a wrong wiring, it may cause the fire or failure.
- In wiring, tighten the terminal screw with standard torque.
  If the terminal screw is loosened, it may cause the short circuit or malfunction.
- Cares should be taken not to put the wire remnants or foreign materials inside the module.

o Notices in Startup and Maintenance

Warning

- Do not touch the terminal in the state that the power is applied. It may cause the malfunction or electric shock.
- When cleaning or tightening the terminal screw, the power should be OFF.

Caution

- Do not remove PCB from the module case or remodel the module. It may cause the failure, malfunction, damage of the product or fire. The installation and removal of the module should be done after Power OFF.
- The change of battery should be done in the state of power ON.
  In case of changing in the power OFF, it may cause the loss of program.

o Notices in Disposal

Caution

- When the product is disposed, this should be treated as industry waste.

Revision History

Issue Date	Manual number	Revised Content
2007. 3.	-	First version issued.

※ The No. of user's manual is indicated on the right side of back cover.

Chapter 8 Troubleshooting

Appendix A Dimension

Chapter 1 Introduction

This manual describes the specifications, handling instructions, and programming information for G4F-HO1C/G4F-HD1C, G6F–HO1C/G6F-HD1C. G4F-HO1C/G4F-HD1C is the high-speed counter module used with CPU of the GM/4/K300S series and G6F-HO1A/G6F-HD1A is the high-speed counter module for the GM6/K200S series.

High Speed Counter Module has functions as below:

1) 1 Phase
   (1) Up/Down counter by program.
   (2) Up/Down counter by phase B.
2) 1, 2, 4 multiple of phase up/down counter for 2 phases.
3) Up/Down counter by phase A/phase B for CW/CCW.
4) Preset/Gate by program or the external terminal.
5) 7 coincidence output conditions by set value and current value
6) 6 additional functions (Count clear, Count latch, Sampling counter, Input frequency counter, Rotation count per hour, Count disable)

Chapter 2 Specifications

2.1 General Specifications

<table>
<tr><th>No.</th><th>Item</th><th colspan="6">Specification</th><th>Standard</th></tr>
<tr><td>1</td><td>Operating temperature</td><td colspan="6">0 ~ 55 ℃</td><td></td></tr>
<tr><td>2</td><td>Storage temperature</td><td colspan="6">-25 ~ 70 ℃</td><td></td></tr>
<tr><td>3</td><td>Operating humidity</td><td colspan="6">5 ~ 95%RH, non-condensing</td><td></td></tr>
<tr><td>4</td><td>Storage humidity</td><td colspan="6">5 ~ 95%RH, non-condensing</td><td></td></tr>
<tr><td rowspan="8">5</td><td rowspan="8">Vibration</td><td colspan="6">Occasional vibration</td><td></td></tr>
<tr><td>Frequency</td><td colspan="2">Acceleration</td><td colspan="2">Amplitude</td><td>Frequency</td><td rowspan="8">IEC61131-2</td></tr>
<tr><td>10 ≤ f < 57Hz</td><td colspan="2">–</td><td colspan="2">0.075mm</td><td rowspan="5">10 times in each direction for X, Y, Z</td></tr>
<tr><td>57 ≤ f ≤ 150Hz</td><td colspan="2">9.8m/s²{1G}</td><td colspan="2">–</td></tr>
<tr><td colspan="6">Continuous vibration</td></tr>
<tr><td>Frequency</td><td colspan="2">Acceleration</td><td colspan="2">Amplitude</td></tr>
<tr><td>10 ≤ f < 57Hz</td><td colspan="2">–</td><td colspan="2">0.035mm</td></tr>
<tr><td>57 ≤ f ≤ 150Hz</td><td colspan="2">4.9m/s²{0.5G}</td><td colspan="2">–</td></tr>
<tr><td>6</td><td>Shocks</td><td colspan="6">• Maximum shock acceleration: 147 m/s²{15G}
*Duration time :11 ms
*Pulse wave: half sine wave pulse(3 times in each of X, Y and Z directions)</td><td>IEC61131-2</td></tr>
<tr><td rowspan="5">7</td><td rowspan="5">Noise immunity</td><td>Impulse noise</td><td colspan="5">±1,500 V</td><td>LSIS Standard</td></tr>
<tr><td>Electrostatic discharge</td><td colspan="5">Voltage :4kV(contact discharge)</td><td>IEC61131-2
IEC61000-4-2</td></tr>
<tr><td>Radiated electromagnetic field</td><td colspan="5">27 ~ 500 MHz, 10 V/m</td><td>IEC61131-2,
IEC61000-4-3</td></tr>
<tr><td rowspan="2">Fast transient burst noise</td><td>Severity Level</td><td>All power modules</td><td>Digital I/Os (Ue ≥ 24 V)</td><td>Digital I/Os (Ue < 24 V) Analog I/Os communication I/Os</td><td rowspan="2">IEC61131-2
IEC61000-4-4</td></tr>
<tr><td>Voltage</td><td>2kV</td><td>1kV</td><td>0.25kV</td></tr>
<tr><td>8</td><td>Operating atmosphere</td><td colspan="6">Free from corrosive gases and excessive dust</td><td></td></tr>
<tr><td>9</td><td>Altitude for use</td><td colspan="6">Up to 2,000m (6,562ft)</td><td></td></tr>
<tr><td>10</td><td>Pollution degree</td><td colspan="6">2 or lower</td><td></td></tr>
<tr><td>11</td><td>Cooling method</td><td colspan="6">Self-cooling</td><td></td></tr>
</table>

Remark

1) IEC (International Electrotechnical Commission)
: The international civilian organization which produces standards for electrical and electronics industry.
2) Pollution degree
: It indicates a standard of operating ambient pollution level.
The pollution degree 2 means the condition in which normally, only non-conductive pollution occurs.
Occasionally, however, a temporary conductivity caused by condensation shall be expected.

2.2 Performance Specifications

2.2.1 Performance specifications

Item		Specifications			
		G4F-HO1C	G6F-HO1C	G4F-HD1C	G6F-HD1C
Occupied I/O points		64 points			
Number of channels		2			
Count input signal	Phase	Phase A, Phase B			
	Level	DC5V / DC12V / DC24V (Selected by terminal block)		RS-422A Line Driver (5V Level) / HTL Line Driver (24V Level)	
	Type	Open Collector		Line Driver	
Counting range		-2,147,488,648 ~ 2,147,488,647 (signed binary 32 bits)			
Max. Counting speed		200 Kpps		500 Kpps(HTL input : 250kpps)	
Input signal type		Voltage			
Count mode (by program)		Linear count (carry/borrow occurred, display max. vaule/min. vaule of count vaule)			
		Ring count(count repeatiton within the range of count setting)			
Pulse input mode		1 phase			
		2 phase			
		CW/CCW			
Up/Down count setting	1 Phase input	Program or Phase B			
	2 Phase input	Difference of phases			
	CW/CCW	Phase A input : Up count			
		Phase B input : Down count			
Multiplication	1 Phase input	1, 2 multiple count (set by program)			
	2 Phase input	1, 2, 4 multiple count (set by program)			
	CW/CCW	1 multiple count			
Control input	Preset	DC 5V / 12V / 24V			
	Gate	DC 5V / 12V / 24V			
Conincidence output	Output points	2 points/channel(terminal output)			
	Comparision type	single comparision(>, ≥ , = , ≤ , <) or district comparision(≤ ≤ , ≥ ≤)			
	Output type	Open collector (Sink type)			
Display of operation status	Input signal	Phase A, Phase B, Preset, Additional function			
	Output signal	comparison 0, comparison 1			
	Operation status	Module ready			
Count enable		By program setting			
Preset enable		External terminal input or Program setting			
Additional functions (by program setting)		Count Clear, Count Latch, Sampling Count, Input frequency count, Rotation count per unit time , Count disable			
Connection type		40pin connector			
Internal current consumption		270㎃	270㎃	330㎃	330㎃
Weight		106 g	93g	110 g	97 g

2.2.2 Pulse input specifications

Item	Specifications			
	Open collector type			Differential input type
Input voltage	DC 24V (17.0V~26.4V)	DC 12V (9.8V~13.2V)	DC 5V (4.5V~5.5V)	RS-422A Line Driver (5V Level)/HTL Line Driver (24V Level)
Input current	7mA~11mA	7mA~11mA	7mA~11mA	
Min. On Assurance voltage	17.0V	9.8V	4.1V	
Max. Off Assurance voltage	4.5V	3.0V	1.7V	

2.2.3 Preset, Gate Input specifications

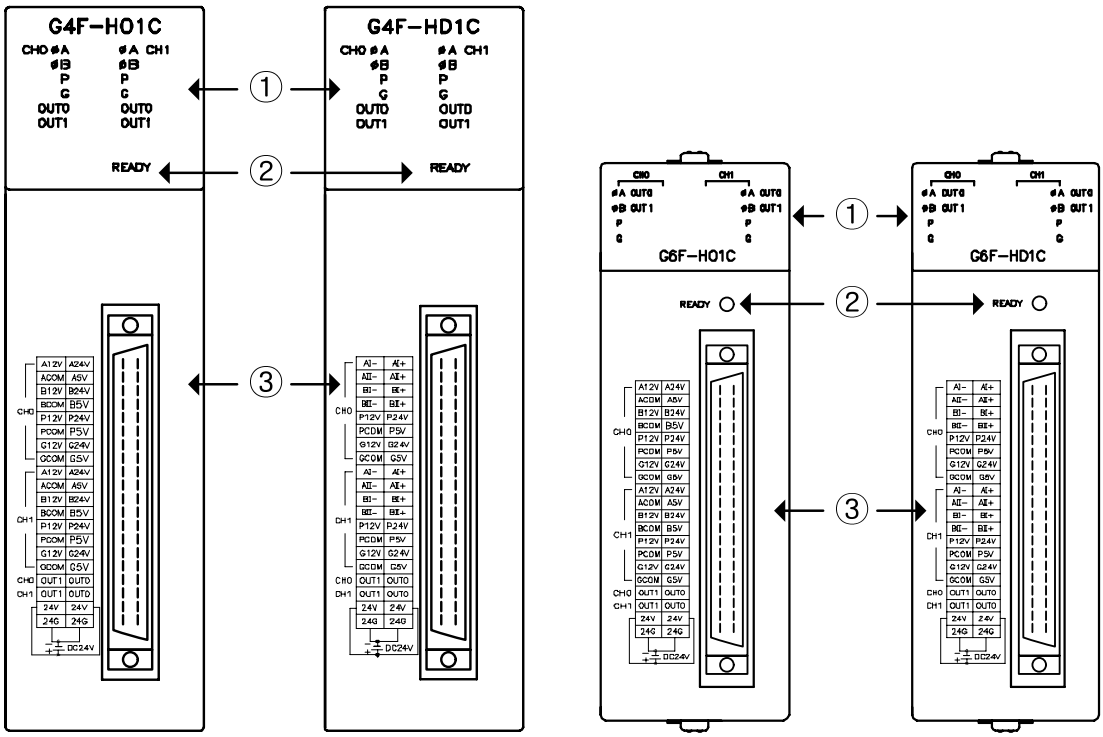
Item	Specifications		
Input voltage	DC 24V (17.0V~26.4V)	DC 12V (9.8V~13.2V)	DC 5V (4.5V~5.5V)
Input current	7mA~11mA	7mA~11mA	7mA~11mA
Min. On Assurance voltage	17.0V	9.8V	4.1V
Max. Off Assurance voltage	4.5V	3.0V	1.7V

2.2.4 Transistor output specifications

Item	Specifications
Ouput type	Transistor Sink
Rated output	DC24V, 100mA/point
Leakage current	0.1 mA or less
Saturation Voltage	1.3 V or less
On Delay Time	0.1ms or less
Off Delay Time	0.1ms or less

2.3 Structure and Characteristics

2.3.1 Structure

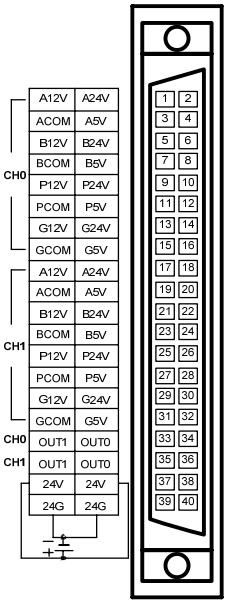


No	Name	Description
①	Display of operation status	On : External pulses is entering Preset/Gate input is On, Coincidence output is On Off : External pulses is not entering Preset/Gate input is Off, Coincidence output is Off
②	Ready signal	On : Normal status(waiting for pulse input) Off : Power off or Reset status of PLC CPU, HSC Module Fault Flickering : HSC Module Fault
③	Connector for external wiring	Connector for the external input and output wiring

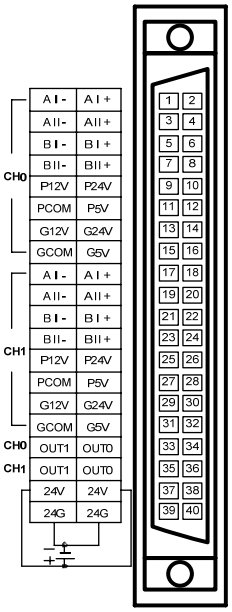
2.3.2 Input/Output terminal

1) Pin arrangement

(1) G4F-HO1C/ G6F-HO1C

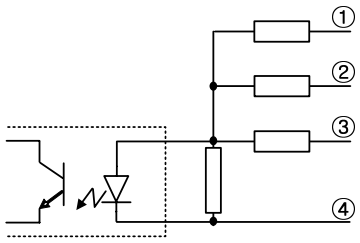
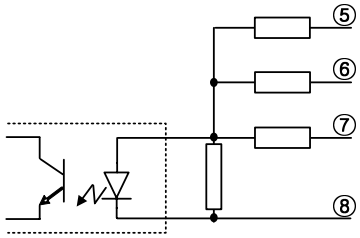
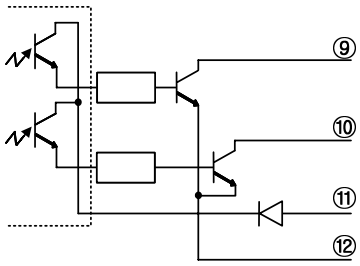
Terminal	Pin no.		Description	
	CH0	CH1		
	1	17	A12V	Phase A DC12V
	2	18	A24V	Phase A DC24V
	3	19	ACOM	Phase A Common
	4	20	A5V	Phase A DC5V
	5	21	B12V	Phase B DC12V
	6	22	B24V	Phase B DC24V
	7	23	BCOM	Preset B Common
	8	24	B5V	Phase B DC5V
	9	25	P12V	Preset DC12V
	10	26	P24V	Preset DC24V
	11	27	PCOM	Preset Common
	12	28	P5V	Preset DC5V
	13	29	G12V	Gate DC12V
	14	30	G24V	Gate DC24V
	15	31	GCOM	Gate Common
	16	32	G5V	Gate DC5V
	33	35	OUT1	OUT1 Coincidence output
	34	36	OUT0	OUT0 Coincidence output
	37	38	24V	External source (+DC24V)
	39	40	24G	External input ground (0V)

(2) G4F-HD1C/ G6F-HD1C

Terminal	Pin no.		Description	
	CH0	CH1		
	1	17	AI-	AI - input (Line Drive RS-422A 5V Level -input)
	2	18	AI+	AI + input (Line Drive RS-422A 5V Level +input)
	3	19	AII-	AII - input (Line Drive HTL 24V Level -input)
	4	20	AII+	AII + input (Line Drive HTL 24V Level +input)
	5	21	BI-	BI - input (Line Drive RS-422A 5V Level -input)
	6	22	BI+	BI + input (Line Drive RS-422A 5V Level +input)
	7	23	BII-	BII - input (Line Drive HTL 24V Level -input)
	8	24	BII+	BII + input (Line Drive HTL 24V Level +input)
	9	25	P12V	Preset DC12V input
	10	26	P24V	Preset DC24V input
	11	27	P_C	Preset COM terminal
	12	28	P5V	Preset DC5V input
	13	29	G12V	Gate DC12V input
	14	30	G24V	Gate DC24V input
	15	31	G_C	Gate COM terminal
	16	32	G5V	Gate DC5V input
	33	35	OUT1	Compared output OUT1
	34	36	OUT0	Compared output OUT0
	37	38	24V	External source (+DC24V)
	39	40	24G	External input ground (0V)

2) Internal Circuit

(1) G4F-HD1C/ G6F-HD1C

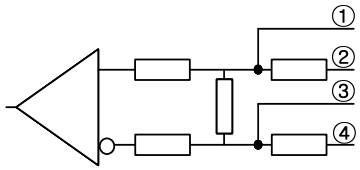
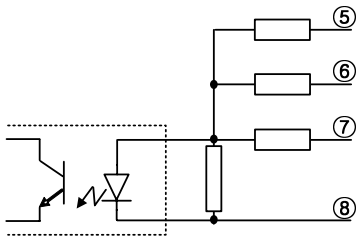
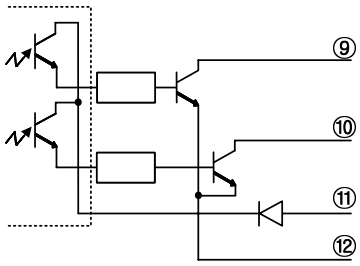
I/O classification	Internal circuit	No.	Terminal (CH0,CH1)	Pin no.		Description
				CH0	CH1	
Input		①	A24V	2	18	Phase A input (DC24V)
		②	A12V	1	17	Phase A input (DC12V)
		③	A5V	4	20	Phase A input (DC5V)
		④	A_COM	3	19	Phase A common
		①	B24V	6	22	Phase B input (DC24V)
		②	B12V	5	21	Phase B input (DC12V)
		③	B5V	8	24	Phase B input (DC5V)
		④	B_COM	7	23	Phase B common
		⑤	P24V	10	26	Preset (DC 24V)
		⑥	P12V	9	25	Preset (DC 12V)
		⑦	P5V	12	28	Preset (DC 5V)
		⑧	P_COM	11	27	Preset common
		⑤	G24V	14	30	Gate (DC 24V)
		⑥	G12V	13	29	Gate (DC 12V)
		⑦	G5V	16	32	Gate (DC 5V)
		⑧	G_COM	15	31	Gate common
Output		⑨	OUT0	34	36	Coincidence output 0
		⑩	OUT1	33	35	Coincidence output 1
		⑪	24V	37	38	External source DC 24V
		⑫	24G	39	40	External source GND

Remark

(1) The external source (24V:37,38, 24G:39,40) is the external input power to output comparison result into the terminal (33, 34, 35, 36).

(2) It is used only for the coincidence output.

(2) G4F-HD1C/ G6F-HD1C

I/O classification	Internal circuit	No.	Terminal (CH0,CH1)	Pin no. CH0	Pin no. CH1	Description
Input		①	AI+	2	18	Phase A Ⅰ Line Drive +
		②	AII+	4	20	Phase A Ⅱ Line Drive+
		③	AI-	1	17	Phase A Ⅰ Line Drive -
		④	AII-	3	19	Phase A Ⅱ Line Drive -
		①	BI+	6	22	Phase B Ⅰ Line Drive +
		②	BII+	8	24	Phase B Ⅱ Line Drive +
		③	BI-	5	21	Phase B Ⅰ Line Drive -
		④	BII-	7	23	Phase B Ⅱ Line Drive -
		⑤	P24V	10	26	Preset (DC 24V)
		⑥	P12V	9	25	Preset (DC 12V)
		⑦	P5V	12	28	Preset (DC 5V)
		⑧	P_COM	11	27	Preset common
		⑤	G24V	14	30	Gate (DC 24V)
		⑥	G12V	13	29	Gate (DC 12V)
		⑦	G5V	16	32	Gate (DC 5V)
		⑧	G_COM	15	31	Gate common
Output		⑨	OUT0	34	36	Coincidence output 0
		⑩	OUT1	33	35	Coincidence output 1
		⑪	OUT2	37	38	External source DC 24V
		⑫	OUT3	39	40	External source GND

Remark

(1) AI+, AI-, BI+, BI- are the input terminals for the 5V Level Line Drive. (RS-422A Level)

(2) AII+, AII-, BII+, BII- are the input terminals for the 24V Level Line Drive. (HTL Level)

2.4 Basic Usage

■ The High-speed count module can count high-speed pulse which cannot be proceed with counting instructions (CTU, CTD, CTUD, etc.)of PLC CPU module up to 32 bits binary (-2,147,483,648 ~ 2,147,483,647).

■ High speed count module has 3 pulse input modes; 1 phase input mode, 2 phase input mode, CW/CCW input mode

■ High speed count module has 4 up/down counting method ;

1 phase : set by program or set by phase B

2 phase : set by the phase difference of phase A and phase B

CW/CCW : Phase A input = count increment, Phase B input = count decrement

■ High speed count module has 6 functions ;

Count clear, Count latch, Sampling count, Pulse frequency count, Rotation count per hour and Count disable.

2.4.1 Pulse input modes

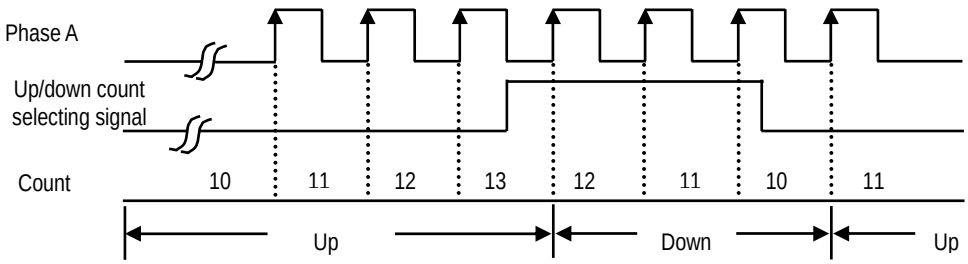
1) 1 Phase pulse input

(1) Up/down count by program

(a) 1 phase multiple of 1

Counting is executed at the rising edge of phase A and either up count or down count is selected by program.

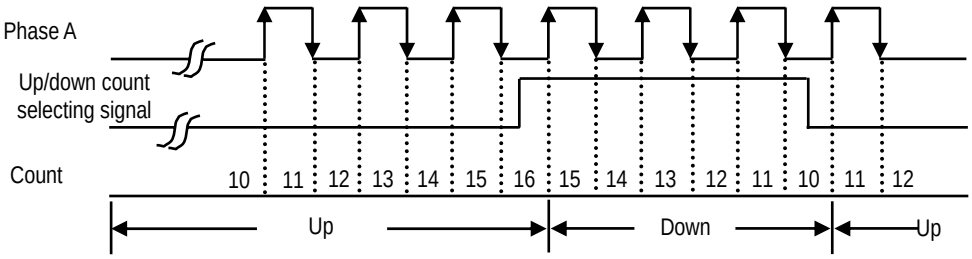
Up/down classification	Phase A rise	Phase A fall
Up/down count selecting signal Off	Up count	-
Up/down count selecting signal On	Down count	-



(b) 1 phase multiple of 2

Counting is executed at the rising edge/ falling edge of phase A and either up count or down count is selected by program.

Up/down classification	Phase A rise	Phase A fall
Up/down count selecting signal Off	Up count	Up count
Up/down count selecting signal On	Down count	Down count

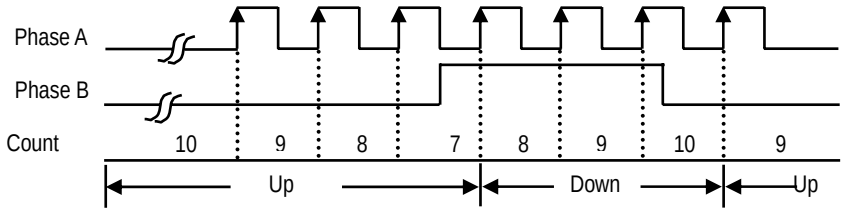


(2) Up/down count by phase B

(a) 1 phase multiple of 1

Counting is executed at the rising edge of phase A and either up count or down count is selected by phase B.

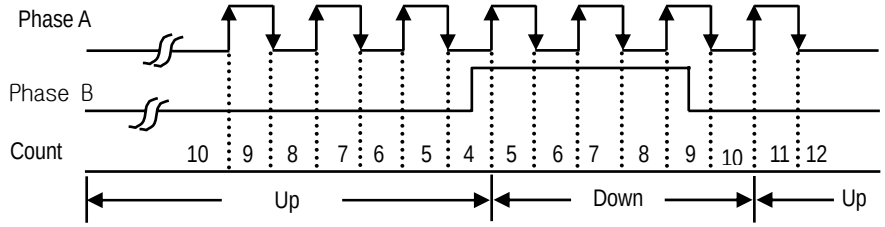
Up/down classification	Phase A rise	Phase A fall
Phase B Low	Up count	-
Phase B High	Down count	-



(b) 1 phase multiple of 2

Counting is executed at the rising edge/ falling edge of phase A and either up count or down count is selected by phase B.

Up/down classification	Phase A rise	Phase A fall
Phase B Low	Up count	Up count
Phase B High	Down count	Down count

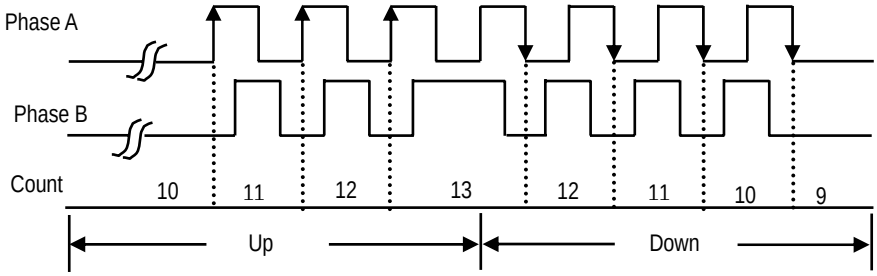


2) 2 phase (up/down count by difference of phases)

(1) 2 phase multiple of 1

Up/down count is executed by the difference of phase A and phase B.

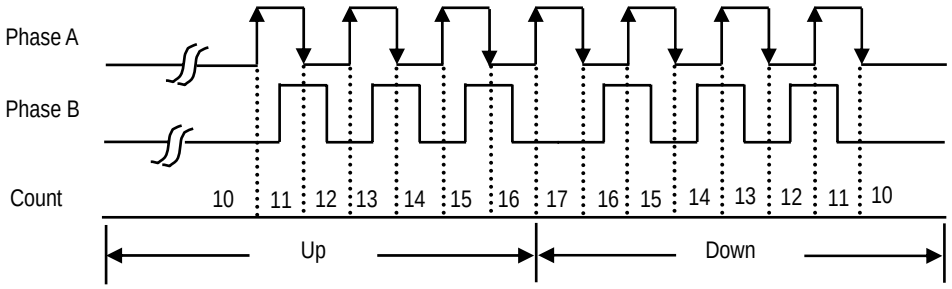
When phase A leads phase B,Up count is executed at the rising edge of phase A, when phase B leads phase B down count is executed at the falling edge of pahse A.



(2) 2 phase multiple of 2

Up/down count is executed by the difference of phase A and phase B at the rising edge and falling edge of phase A.

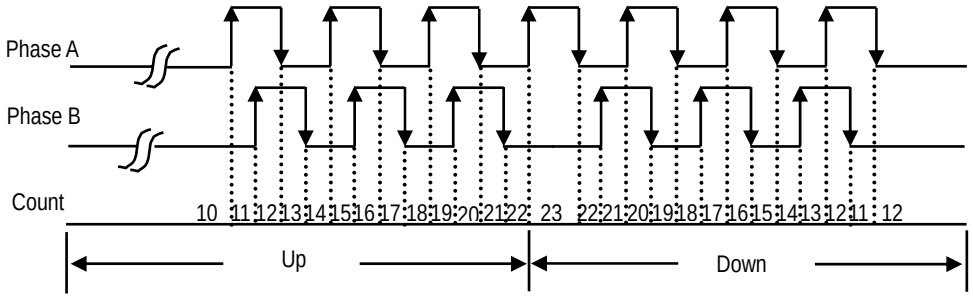
when phase A leads phase B up count is executed and when phase B leads phase A down count is executed.



(3) 2 phase multiple of 4

Up/down count is executed by the difference of phase A and phase B at the rising edge and falling edge of phase A / pahse B.

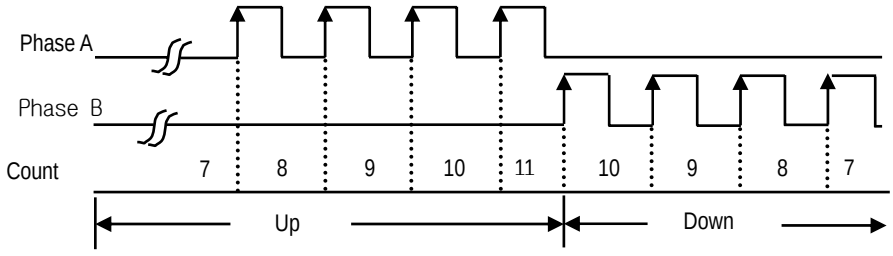
when phase A leads phase B up count is executed and when phase B leads phase A down count is executed.



3) CW (Clockwise)/CCW (Counter Clockwise)

Counting is executed at the rising edge/ falling edge of phase A and phase B.

The relationship between phase A pulse input and phase B pulse input is shown below.



2.4.2 Count mode

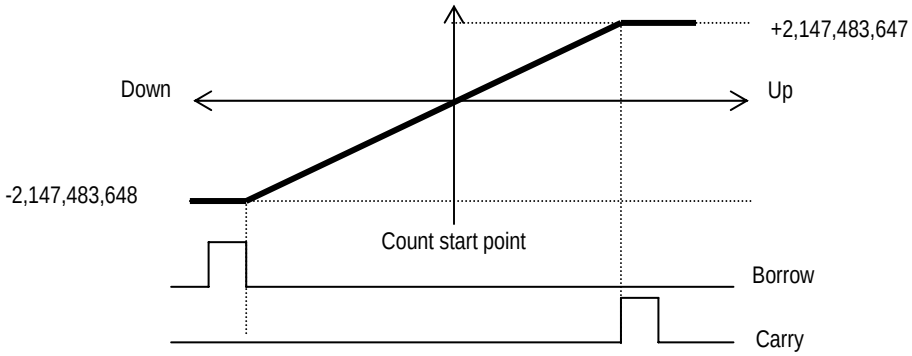
1) Linear count

(1) Count range: -2,147,483,648 ~ 2,147,483,647 (32 bit signed binary values)

(2) When count value reaches at the maximum value, carry is occurs and when count value reaches at the minimum value, borrow is occurred.

(3) If carry occurs, counting stops and no more up-count is performed but down-count is possible.

(4) If borrow occurs, counting stops and no more down-count is performed but up-count is possible.



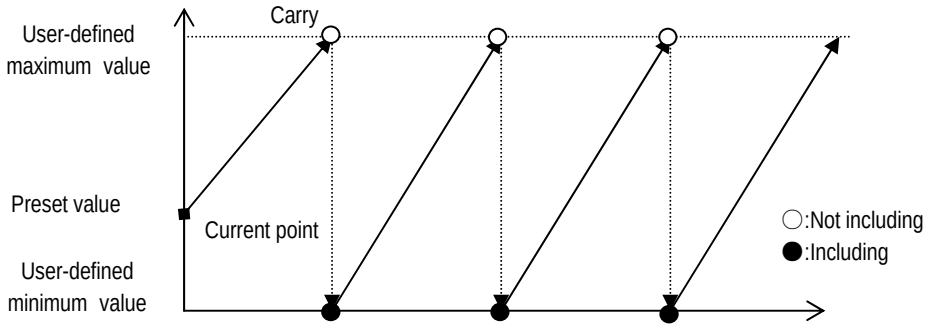
2) Ring count

(1) Count range: user-defined minimum value ~ user-defined maximum value.

(2) Count display: when performing the ring count, the user-defined minimum value is displayed but maximum value is not displayed. This is same at up count and down count.

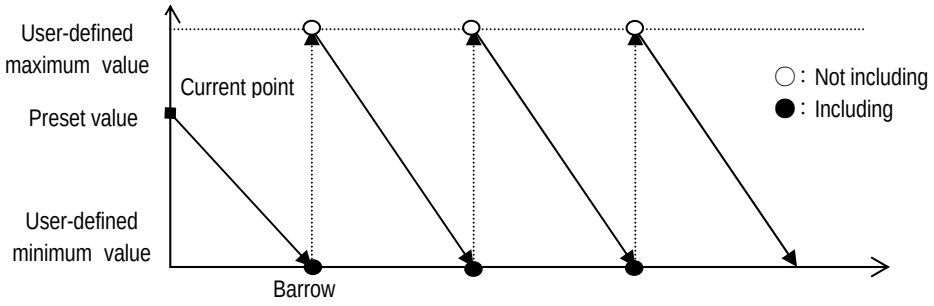
(3) Up count:

When the count value exceeds the user-defined maximum value, carry occurs but the counting is executed continuously.



(4) Down count:

When the count value exceeds the user-defined minimum value, borrow occurs but the counting is executed continuously.



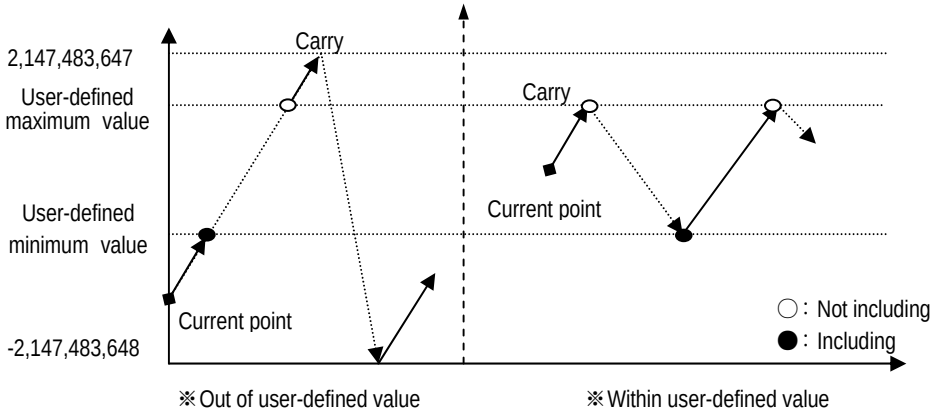
(5) Ring count execution according to the current value (for up count)

(a) When the current value is set out of the user-defined maximum / minimum value.

- Count value increases and at the user-defined minimum value if adding one pulse, the count value goes up to the user-defined maximum value and then up count goes on.
- When the count value exceeds 2,147,483,647, carry occurs and the count value goes down to –2,147,483,648 and then up count goes on.

(b) When the current value is set within the user-defined maximum / minimum value.

- Up count value increases and at the user-defined maximum value if adding one pulse, the count value goes down to the user-defined minimum value and then up count goes on.
- When the count value goes from the user-defined maximum value to user-defined minimum value, carry occurs.



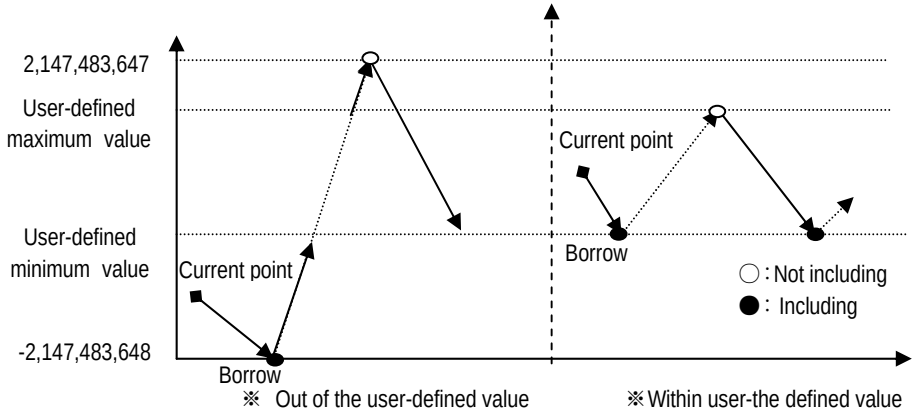
(6) Ring count execution according to current value (for down count)

(a) When the current value is set out of the user-defined maximum / minimum value.,

- Count value decreases and at the user-defined maximum value if adding one pulse, the count value goes up to the user-defined minimum value and then down count goes on.
- When the count value exceeds -2,147,483,647, borrow occurs and the count value goes down to 2,147,483,648 and then down count goes on.

(b) When the current value is set within the user-defined maximum / minimum value.,

- Down count value exceeds and at the user-defined minimum value if adding one pulse, the count value goes up to the user-defined maximum value and then down count goes on.
- When the count value goes from user-defined minimum value to the user-defined maximum value, borrow occurs.



Remark

(1) Whether the ring count value is counted within the user defined value or not, it depends on the count value at the time when the ring count is set.

(2) When using the ring count, be sure to set the count value within the user defined value by using the preset value.

2.4.3 Coincidence output

(1) Coincidence output is a function which compares current count value with the user-defined value and output when the condition matches.

(2) Coincidence output can be set for 2 outputs in each channel and used independently.

(3) Coincidence output conditions can be set in 7 methods. (>, = , <, ≤, ≥, ≤ ≤, ≥ ≥)

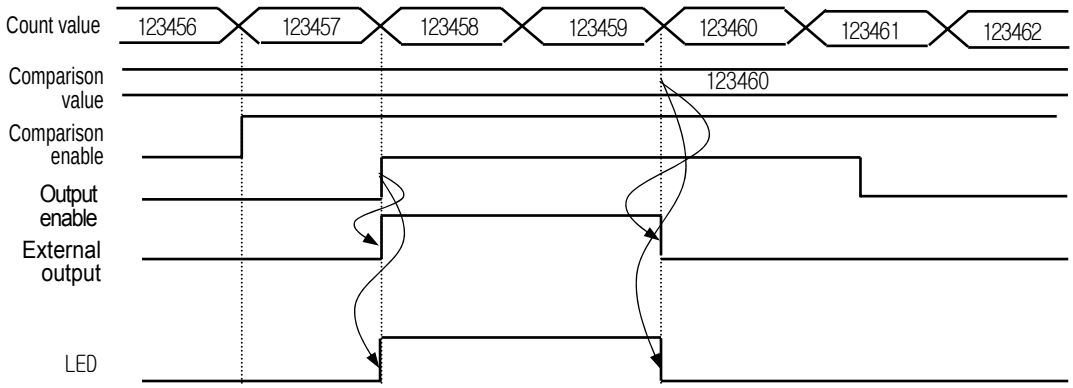
(4) After coincidence setup, for using coincidence output, you have to turn on the comparison enable and the coincidence output enable.

(5) If the coincidence output enable is turned off and the comparison enable is turned on, only LED is lit and the coincidence output is not outputted practically.

1) Coincidence output mode 0 (Count value < Comparison value)

The coincidence output is turned on when the current count value is fewer than the comparison value.

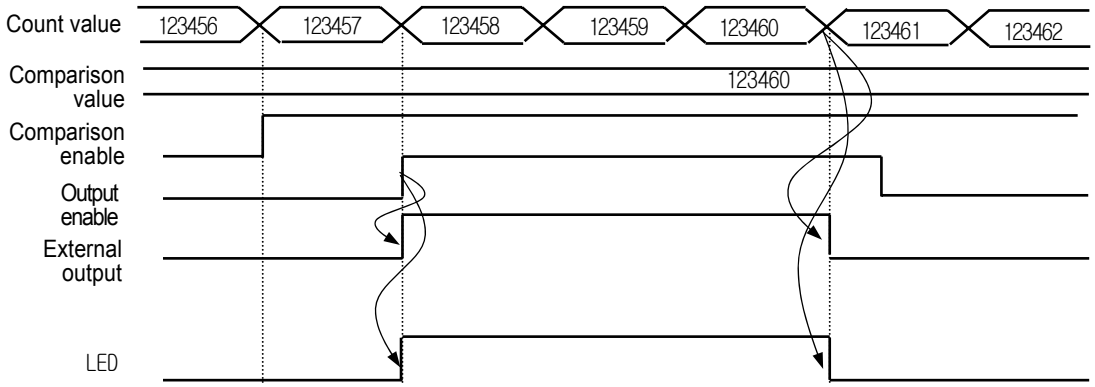
If the current value equals to or more than the comparison value the coincidence output is turned off.



2) Coincidence output mode 1 (Count value ≤ Comparison value)

The coincidence output is turned on when the count value is equal to or less than the user-defined comparison value.

If the count value is more than the user-defined comparison value, the coincidence output is turned off.

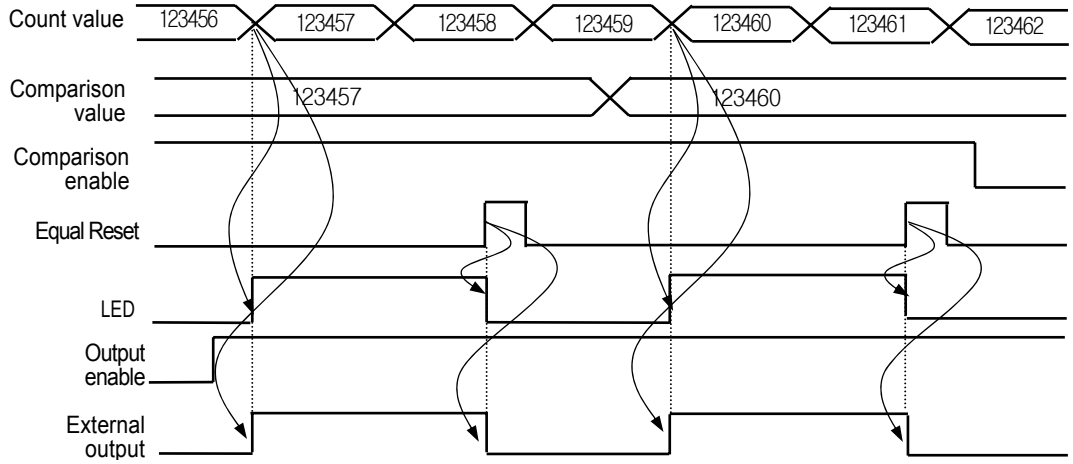


3) Coincidence output mode 2 (Count value = Comparison value)

The external coincidence output is turned on when the count value is equal to the user-defined comparison value.

If the external coincidence output is On, though the count value is not equal to the user-defined comparison value, the external coincidence output is not turned off.

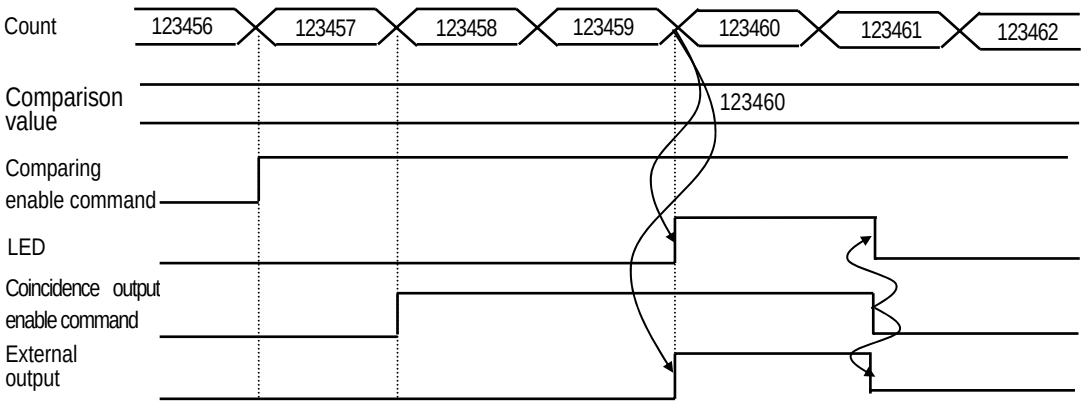
To turn off the external coincidence output, the equal reset command should be On.



4) Coincidence output mode 3 (Count value ≥ Comparison value)

The coincidence output is turned on when the count value is equal to or more than the user-defined value.

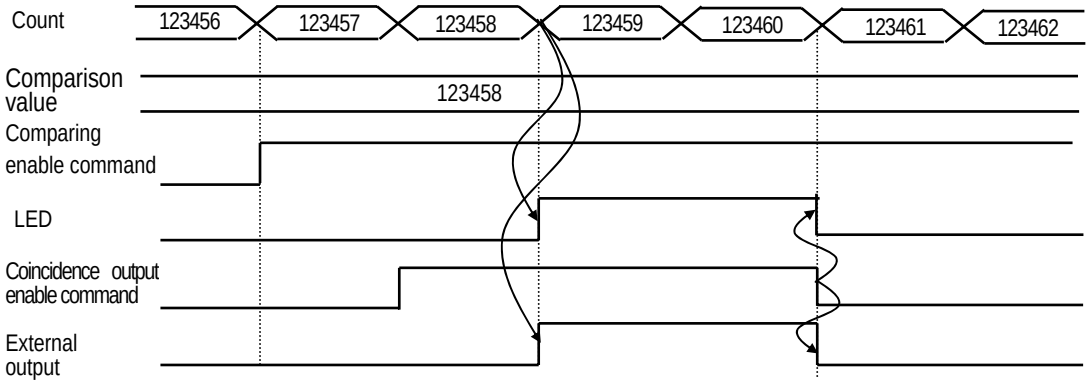
If the count value is less than the user-defined comparison value, the external coincidence output is turned off.



5) Coincidence output mode 4 (Count value > Comparison value)

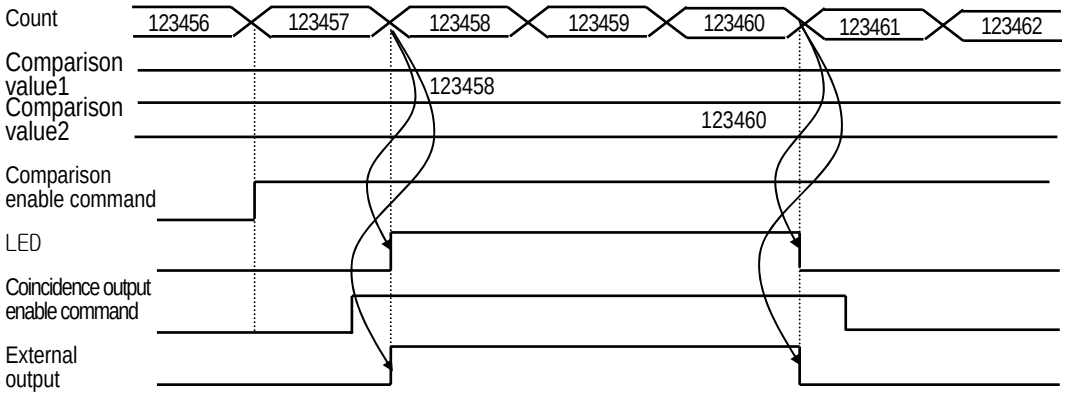
The coincidence output is turned on when the count value is more than the user-defined value.

If the count value is equal to or less than the user-defined comparison value, the external coincidence output is turned off.



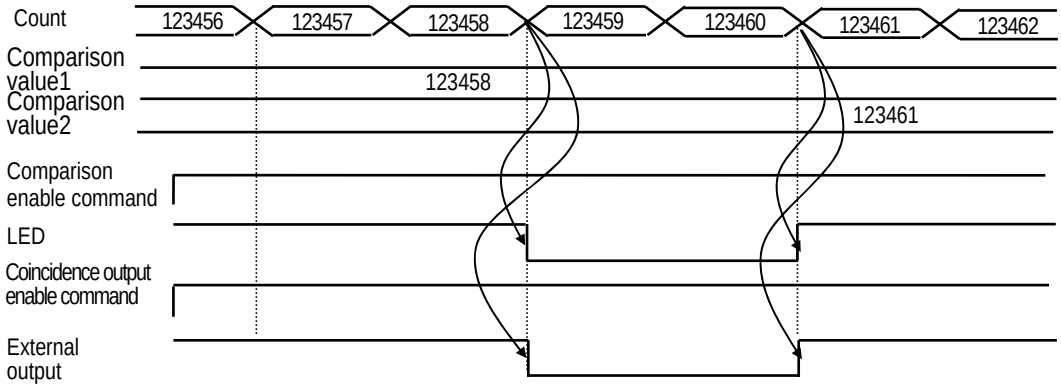
6) Coincidence output mode 5 (Comparison value1 ≤ Count value ≤ Comparison value2)

The coincidence output is turned on in the case of Comparison value1≤ Count value ≤ Comparison value2. If the count value is not within the section, the external coincidence output is turned off.



7) Coincidence output mode 6 (Count value≤ Comparison value1 or Count value ≥ Comparison value1)

The coincidence output is turned on in the case of Count value≤Comparison value1 or Comparison value2 ≤ Count value. If the count value is not within the section, the external coincidence output is turned off.



2.4.4 Carry

(1) Carry signal occurs

- For linear count, when the count value reaches 2,147,483,647 which it is maximum value of count range.
- For ring count, when the count value goes from the user-defined maximum value to the user-defined minimum value.

(2) State of count when Carry signal occurs.

- For linear count, if Carry signal occurs count stops.
- For ring count, though Carry signal occurs, counting still goes on.

(3) Carry reset

- Carry can be reset by carry/borrow reset command.

2.4.5 Borrow

(1) Borrow occurs

- For linear count, when the count value reaches -2,147,483,648 which it is minimum value of count range.
- For ring count, when the count value goes from the user-defined minimum value to the user-defined maximum value.

(2) State of count when Borrow signal occurs.

- For linear count, if Borrow signal occurs count stops.
- For ring count, though Borrow signal occurs, counting still goes on.

(3) Borrow reset

- Borrow can be reset by carry/borrow reset command.

2.4.6 Supplementary functions

■ High Speed Counter Module has 6 functions. This section describes this supplementary functions.

For using a supplementary function, the supplementary function enable command shall be “On”.

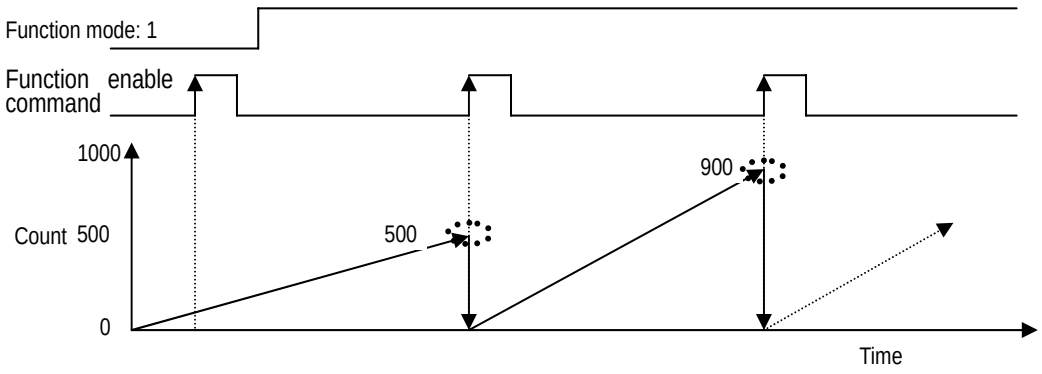
1) Count Clear

(1) In this function, if supplementary function enable command is On, the count value is turned to 0.

(2) How to set

- Setting supplementary function mode 1 -> Function enable command is On .

(3) Count clear makes the current count value clear to 0 in each time the function enable command is On.



Remark

※ Supplementary function enable command:

When using the internal command, please set the external input enable of supplementary function “0”.

When using the external input, after setting the external input enable of supplementary function “1”, please use the supplementary function input terminal (GATE).

2) Count Latch

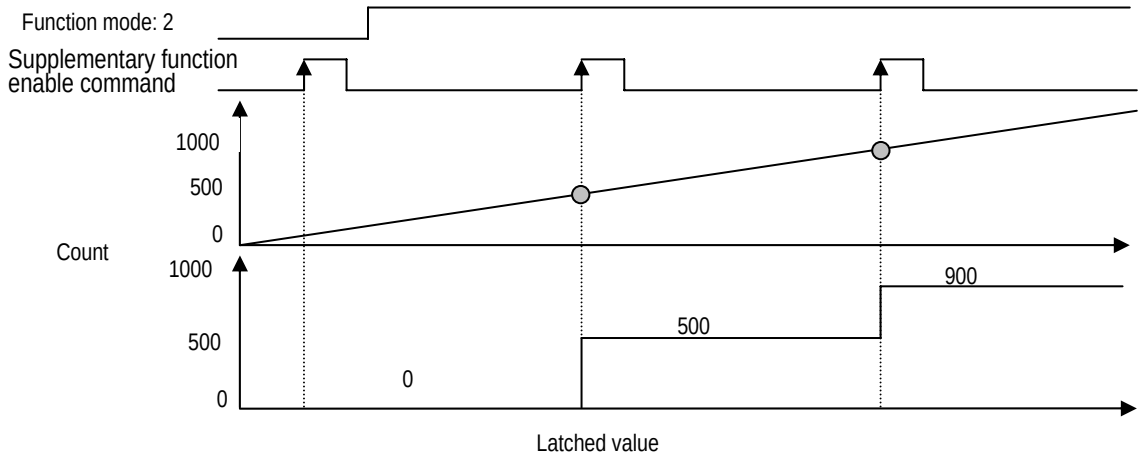
(1) In this function, if supplementary function enable command is On, the current count value is latched and stores the value in the internal buffer memory.

(2) How to set

- Setting supplementary function mode 2 -> Function enable command is On .

(3) Count latch function latches the current count value in each time the function enable command is On. Therefore, counting is not operated when supplementary function enable is On

(4) The latched count value is displayed as latch count until the next supplementary function is On.



3) Sampling Count

(1) In this function, if supplementary function enable command is On, Count is executed during the preset time and stores the value in the internal buffer memory.

(2) How to set

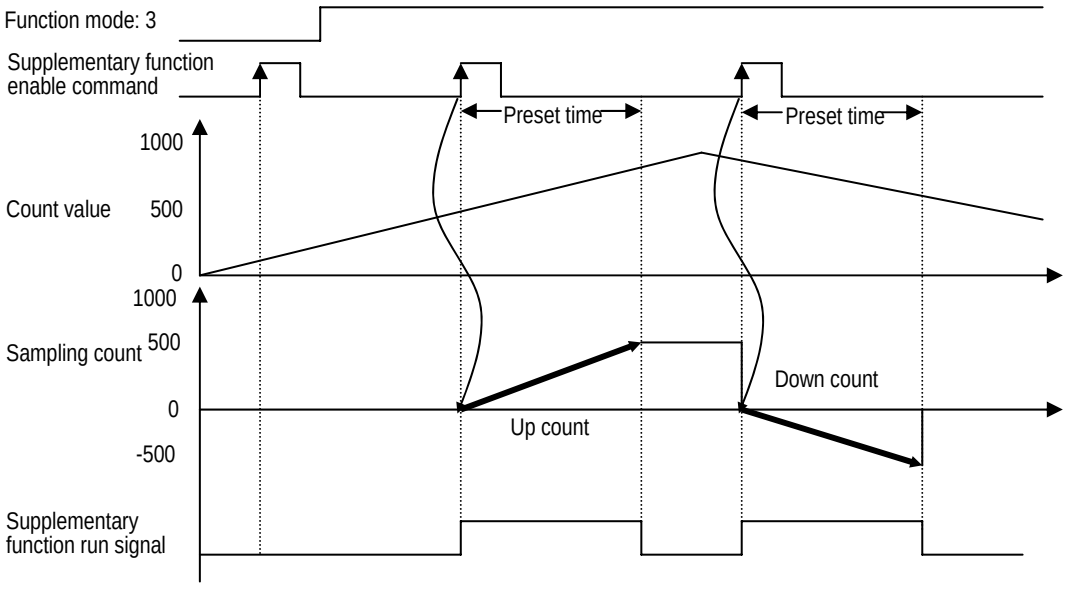
- Selecting supplementary function mode 3 -> Setting the preset time -> Supplementary function enable command is On.

(3) Sampling count is executed from count value 0 during the preset time in each time the supplementary function enable command is On.

(4) The value which is counted during the preset time is displayed as sampling count value.

(5) The signal for displaying during the supplementary function run.

- During the preset sampling time, sampling count is executed and at the same time the supplementary function run signal is turned On.



4) Input frequency count

(1) In this function, if supplementary function enable command is On, input frequency count is executed every second (or per the setting time) and stored in the internal buffer memory.

(2) How to set

- Setting supplementary function mode 4 -> Supplementary function enable command is On .

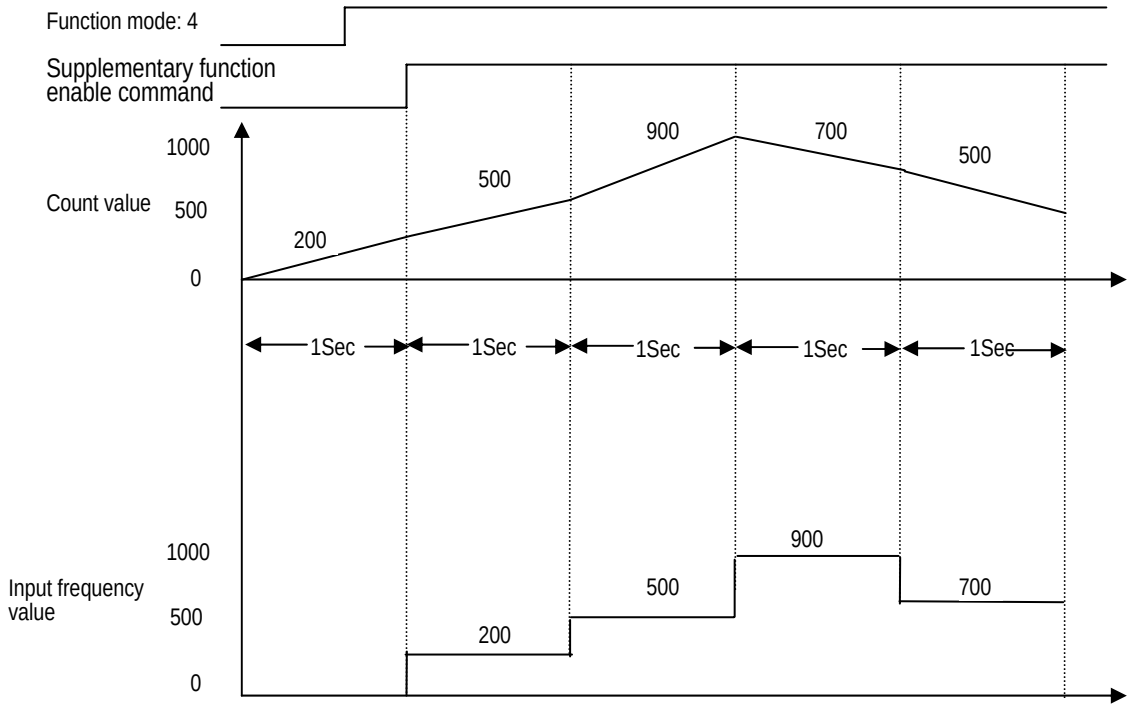
(3) During the function enable command is On, the frequency count renewed according to setting unit (1Hz:1s, 10Hz:100ms, 100Hz:10ms, 1kHz:1ms) is stored as input frequency.

(4) The frequency input mode is as below, and it is decided to the revised cycle according to frequency input mode.

Frequency input mode	Basic unit [Hz]	Revised cycle T [ms]
0	1	1000
1	10	100
2	100	10
3	1000	1

(5) The signal for displaying during the supplementary function run.

- During the supplementary function enable command is On, frequency count function is executed and at the same time, the supplementary function run signal is turned On.
- For example, the operation of frequency input mode “0” is as below.



5) Rotation count per unit time

(1) In this function, if supplementary function enable command is On, rotation count about the setting time is stored in the internal buffer memory as using the preset time and pulse count per 1 rotation.

(2) How to set

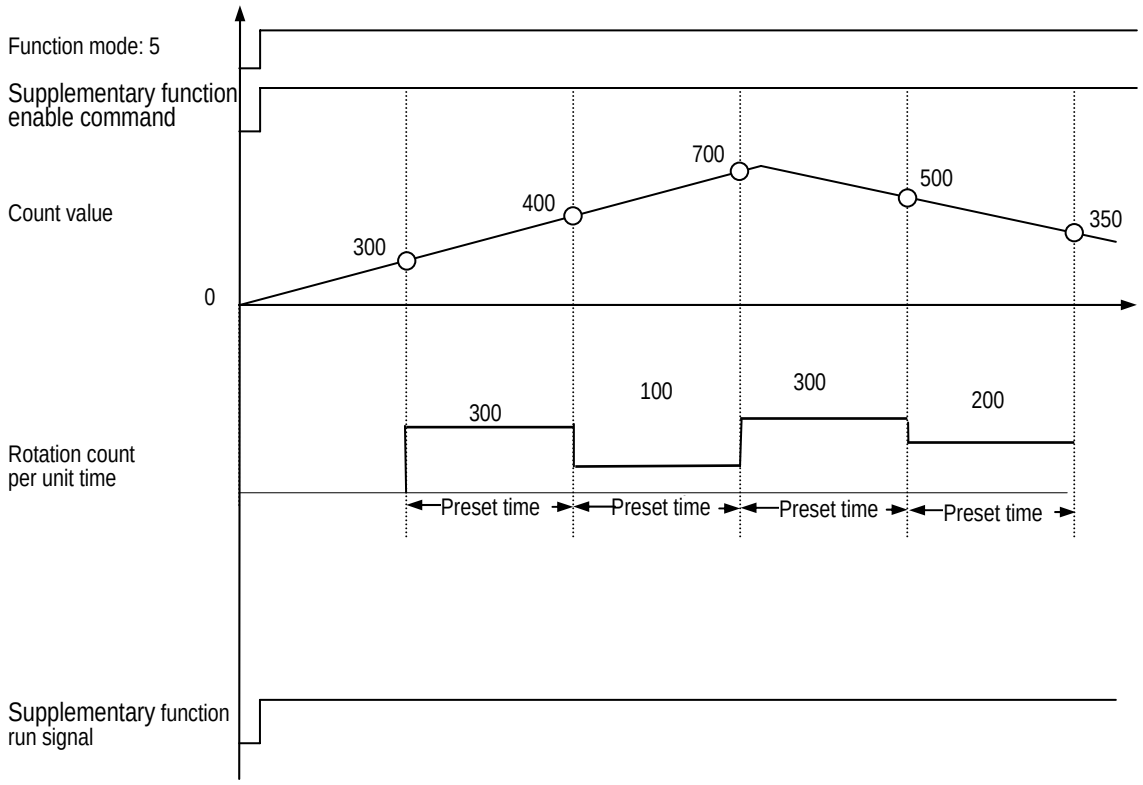
- Setting function mode 5 -> Setting the preset time and pulse count per 1 rotation -> Supplementary function enable command is On .

(3) If the preset time is 1 minute(60,000ms), rotation count per 1 minute(RPM) can be calculated.

But RPM count displayed is renewed per 1 minute.

(4) The signal for displaying during the supplementary function run.

- During the function enable command is On, rotation count per unit time function is executed and at the same time, the supplementary function run signal is turned On.
- For example, the operation of pulse count per 1 rotation “1” is as below.



6) Count disable

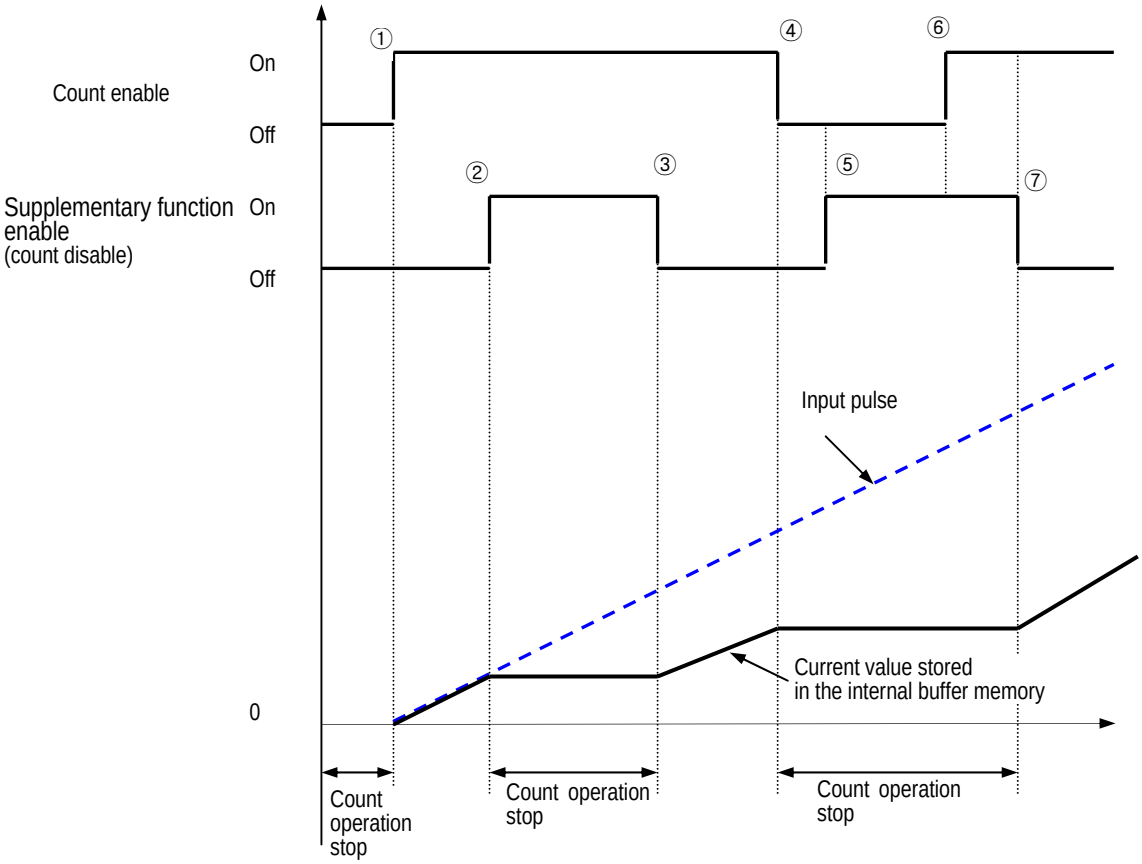
(1) When supplementary function enable command is On, it is the function that it stops the count operation.

(2) How to set

- Setting function mode 6 -> Supplementary function enable command is On .

(3) The signal for displaying during the supplementary function run.

- During the function enable command is On, the count operation is stopped and at the same time, the supplementary function run signal is turned On.



① When count enable is On, it starts the count operation

② When supplementary function enable is On (selecting internal/external input), it stops the count operation

③ When supplementary function enable is Off, it starts again the count operation.

④ When count enable is Off, it stops the count operation

⑤ Though count enable is Off, it stops the count operation without regard to count enable

⑥ Though count enable is On, if supplementary function enable is On, it still stops the count operation

⑦ When supplementary function enable is Off, it starts again the count operation.

Chapter 3 Installation and Wiring

3.1 Installation

3.1.1 Installation ambience

This module has high reliability regardless of its installation ambience. But be sure to check the following conditions for the higher reliability and stability of the system.

1) Ambience Requirements

Avoid installing this module in places, which are subjected or exposed to:

- Water leakage and dust a large amount of dust, powder and other conductive power, oil mist, salt, of organic solvent.
- Mechanical vibrations of impacts transmitted directly to the module body.
- Direct sunlight.
- Dew condensation due to sudden temperature change.
- High or low temperatures (outside the range of 0-55℃)

2) Installing and Wiring

- During wiring or other work, do not allow any wire scraps to enter into it.
- Install it on locations that are convenient for operation.
- Make sure that it is not located near high voltage equipment on the same panel.
- Make sure that the distance from the walls of duct and external equipment be 50 mm or more.
- Be sure to be grounded to locations that have good noise immunity.

3.1.2 Handling precautions

1) Do not drop or impact the product.

2) Do not detach PCB from the case, it may cause malfunction.

3) During wiring or other work, do not allow any wire chips get inside the product.

4) Switch the external power off before mounting or removing the module and the cable.

3.2 Wiring Precautions

When using High-speed count module, take the following precautions against noise in wiring.

1) Be sure to use shielded twisted pair cables and provided class 3 grounding.

2) Separate a twisted pair cable from power cables or I/O line that may generate noise.

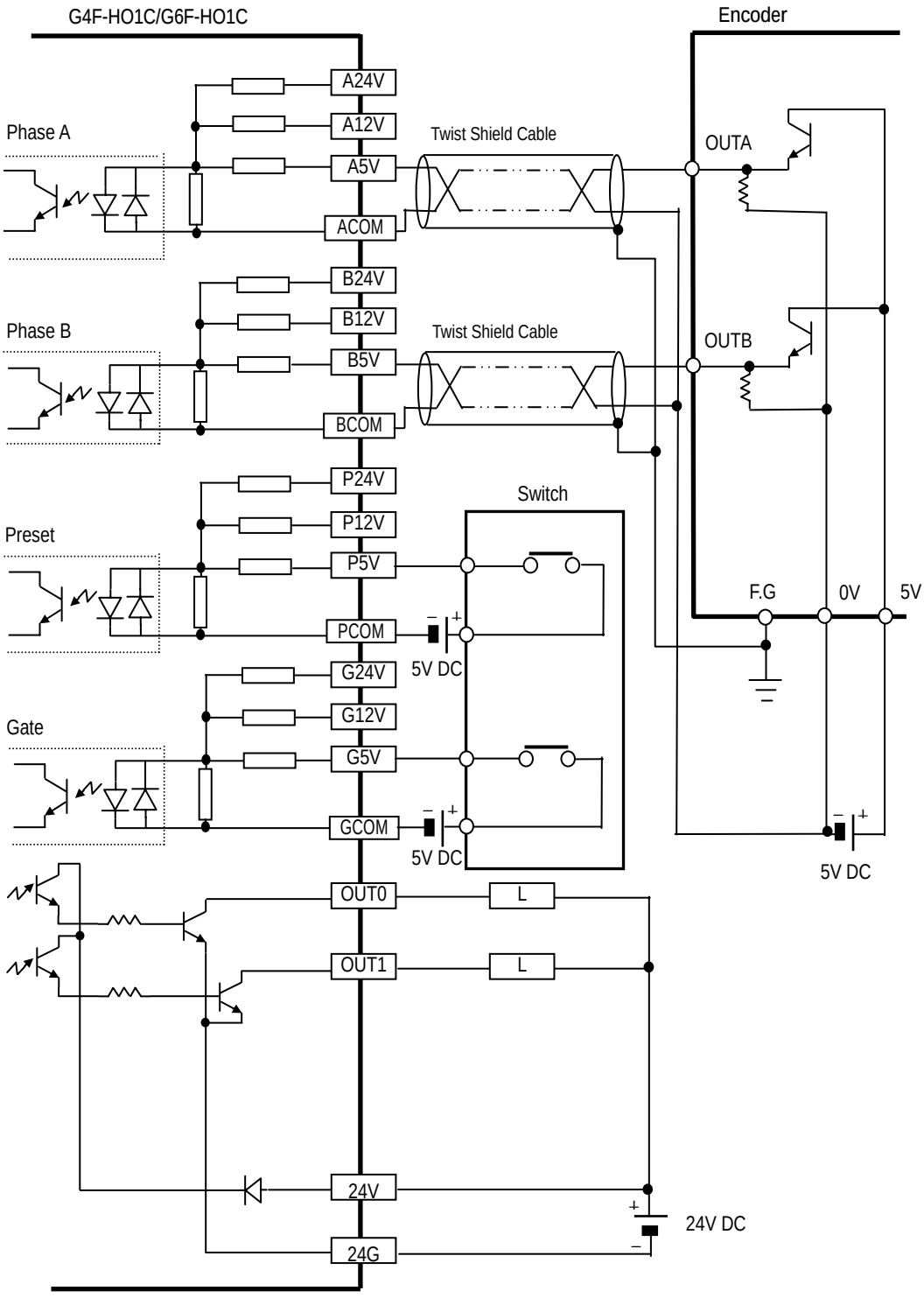
3) Use a stabilized power supply for pulse generator.

- ▶ For 1-phase input, connect count-input signal only to phase A;
- ▶ For 2-phase input, connect to phases A and B.

3.2.1 DC5V Output type encoder

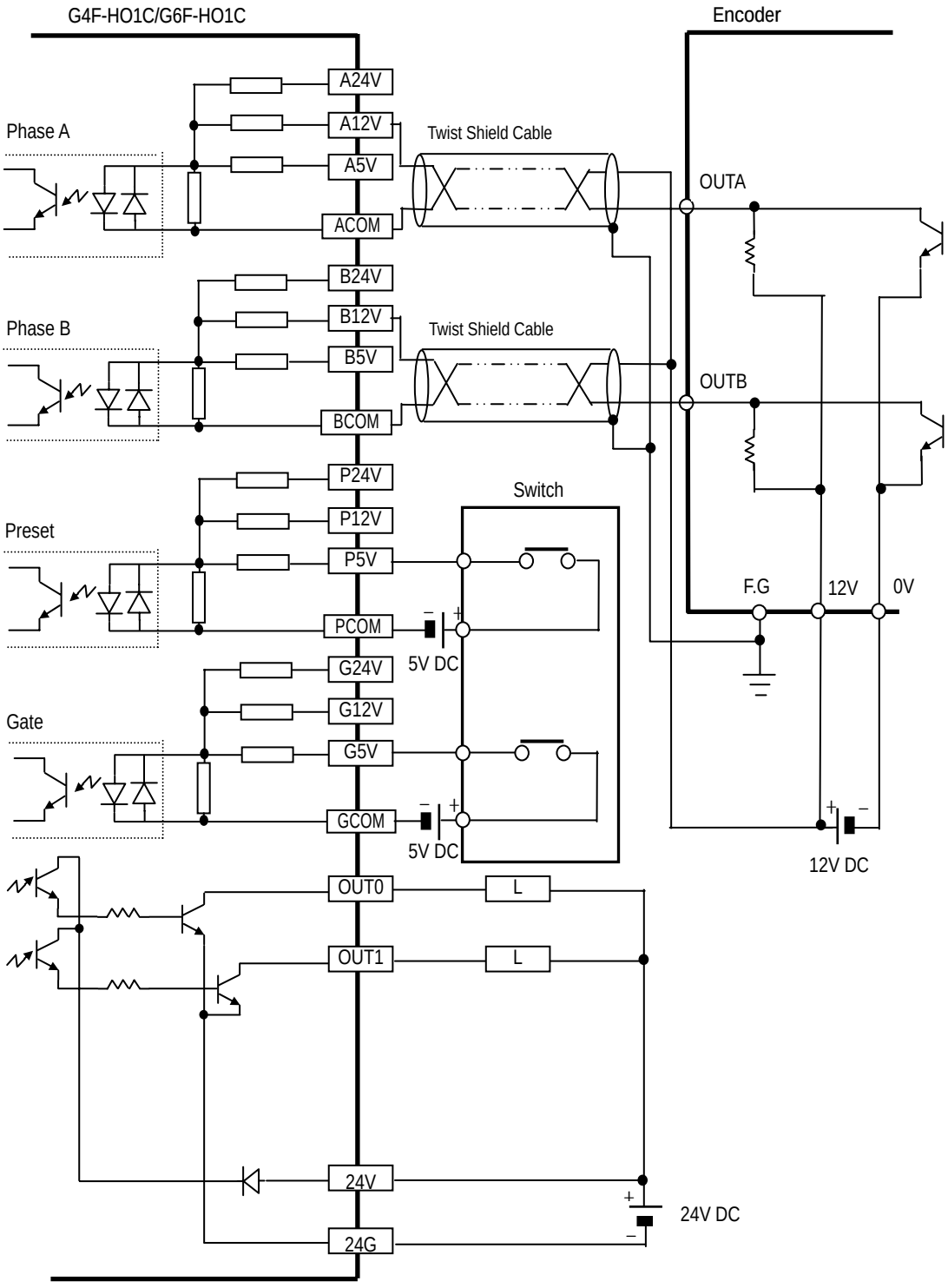
In case of the encoder of voltage output type or totem-pole output type, wiring methods for high speed counter module is as below.

Please confirm the maximum output distance of pulse generator (Encoder) before cable wiring.



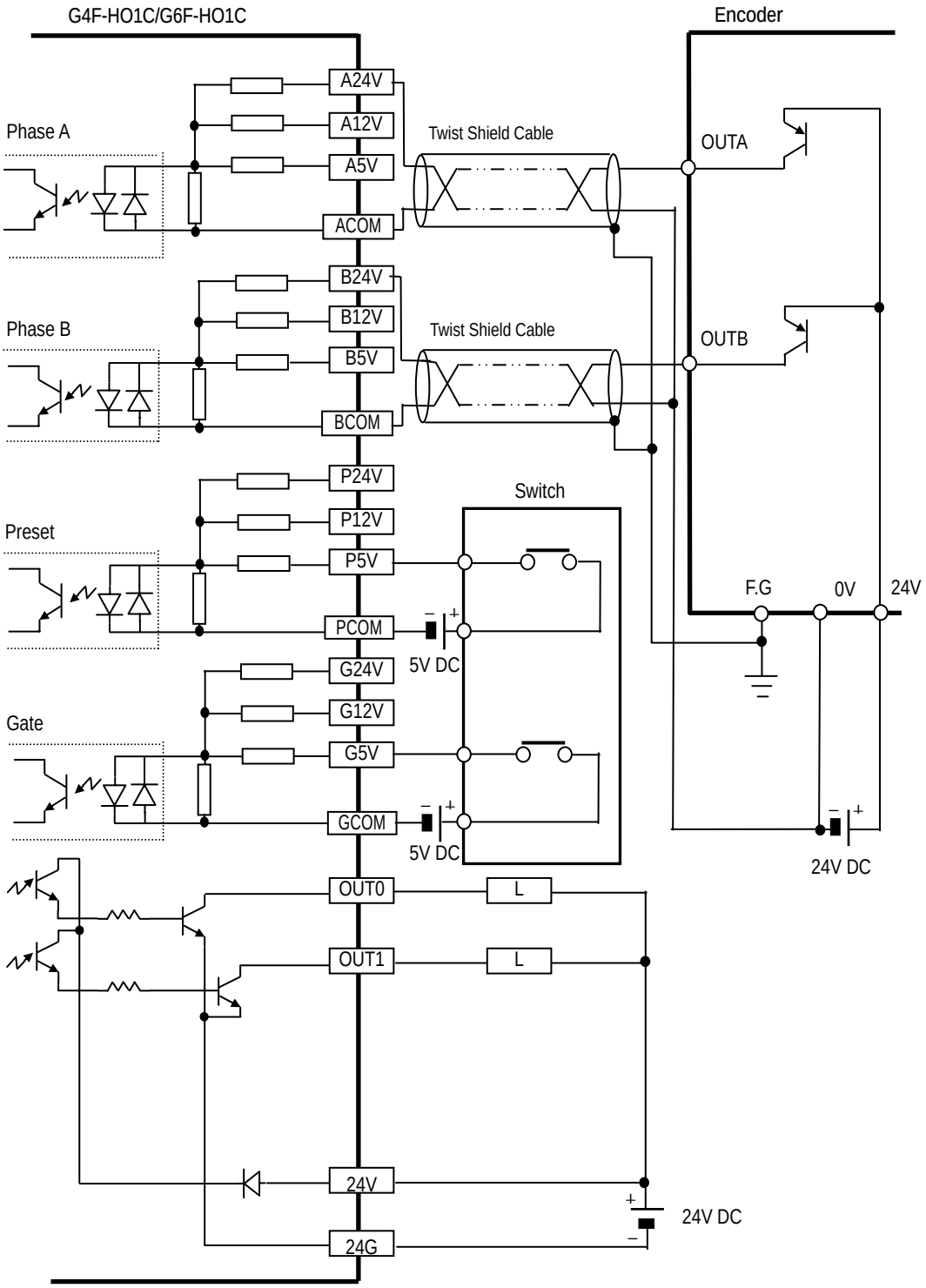
3.2.2 DC12V NPN Open collector type encoder

Please confirm the maximum output distance of pulse generator (Encoder) before cable wiring



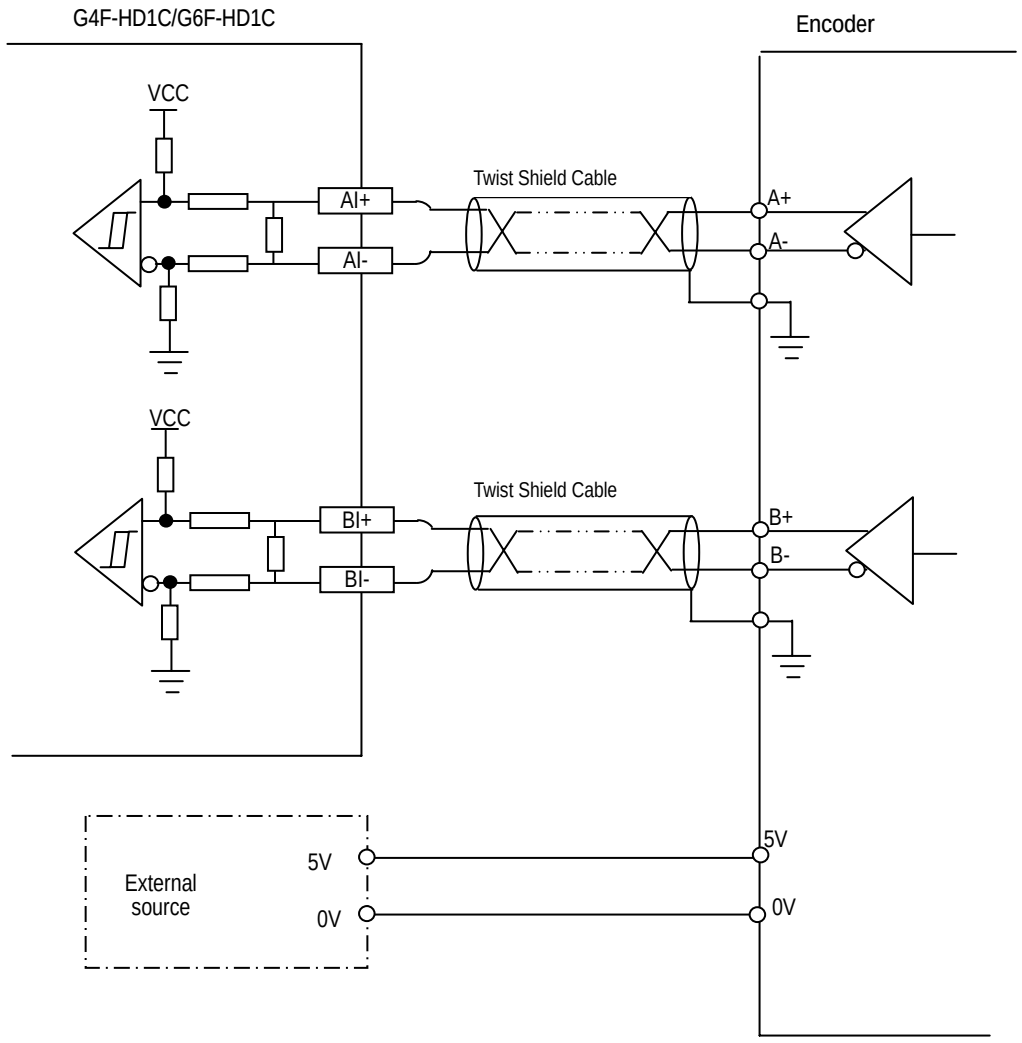
3.2.3 DC24V PNP Open collector type encoder

Please confirm the maximum output distance of pulse generator (Encoder) before cable wiring



3.2.4 Line driver type encoder

RS-422A Line Driver (5V Level)



Remark

(1) In case of 24V Level Line Driver, please connect to AII+, AII-, BII+, BII- terminal.

Chapter 4 Function Block

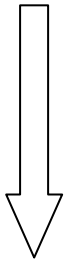
■ This chapter describes function blocks for High-Speed Count Module.

No	Function Block Name	Description	Remark
1	HSCC_PRE	Setting the preset value	Local Function Block
2	HSCC_MOD	Setting the pulse input mode	
3	HSCC_AUX	Setting the supplementary function	
4	HSCC_CMP	Setting the comparison function	
5	HSCC_CNT	Reading the current count value	
6	HSCC_WR	Setting the operating function	
7	HSCC_RD	Reading the operation information	
8	HSCC_OUT	Setting the coincidence output	

4.1 Insertion of the Function Block on the GMWIN

Function Block is inserted on the execution of the GMWIN according to following procedure.

Project (P)

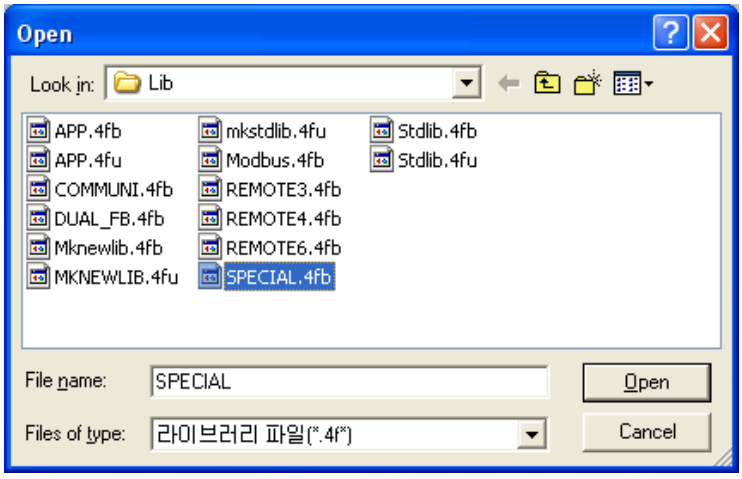


Library insertion

G4F-HO1C, G4F-HD1C
1. Special.4fb
2. Special.2fb

G6F-HO1C, G6F-HD1C
1. Special.6fb

■GMWIN V3.62 Example



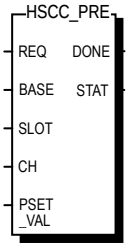
Remark

(1) Please use GMWIN V4.13 more than to insert the function block for G4F-HO1C, G4F-HD1C, G6F-HO1C and G6F-HD1C

4.2 Local Function Block

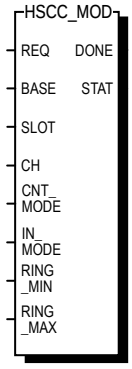
4.2.1 Preset setting function block (HSCC_PRE)

■ This function block sets the preset value.

Figure	I/O	Variable name	Data type	Description
	Input	REQ	BOOL	Function block execution request in the condition of rising edge. ● When this variable is turned "0→1"(rising edge), this function block is executed.
		BASE	USINT	Base location No. ● Number of base that high-speed counter module is mounted. ● Range GM4 series : 0 ~ 3 (GM4 -CPUC : 0 ~ 7) GM6 series : 0 (12 slot base : 0 ~ 1)
		SLOT	USINT	Slot location No. ● Number of slot that high-speed counter module is mounted. ● Range : 0 ~ 7
		CH	BOOL	Channel ● "0": channel 0, "1": channel 1
		PSET _VAL	DINT	Preset value ● Range : -2,147,483,648 ~ 2,147,483,647
	Output	DONE	BOOL	Function block execution complete signal ● If this function block is executed without error, DONE is "1" and the opposite case "0".
		STAT	USINT	The range which it is displayed to the error status. ● Indicates the error number that occurs during execution of the function block. ● Please refer to 4.3 Error code on the function block.

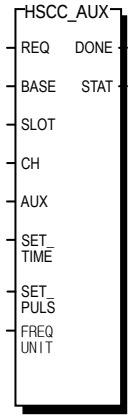
4.2.2 Count mode setting function block (HSCC_MOD)

■ This function block sets the high speed count mode and linear count/ring count.

<table>
<tr><th>Figure</th><th>I/O</th><th>Variable name</th><th>Data type</th><th>Description</th></tr>
<tr><td rowspan="11"> 
</td><td rowspan="9">Input</td><td>REQ</td><td>BOOL</td><td>Function block execution request in the condition of rising edge.
● When this variable is turned “0→1”(rising edge), this function block is executed.</td></tr>
<tr><td>BASE</td><td>USINT</td><td>Base location No.
● Number of base that high-speed counter module is mounted.
● Range
GM4 series : 0 ~ 3 (GM4 -CPUC : 0 ~ 7)
GM6 series : 0 (12 slot base : 0 ~ 1)</td></tr>
<tr><td>SLOT</td><td>USINT</td><td>Slot location No.
● Number of slot that high-speed counter module is mounted.
● Range : 0 ~ 7</td></tr>
<tr><td>CH</td><td>BOOL</td><td>Channel
● “0”: channel 0, “1”: channel 1</td></tr>
<tr><td>CNT_ MODE</td><td>BOOL</td><td>Setting the count mode
● 0: Linear count
● 1: Ring count</td></tr>
<tr><td>IN_ MODE</td><td>USINT</td><td>Pulse input mode
● Range : 0 ~ 7
<table><tr><th>Value</th><th>Description</th></tr><tr><td>0</td><td>2 phase multiple of 1</td></tr><tr><td>1</td><td>2 phase multiple of 2</td></tr><tr><td>2</td><td>2 phase multiple of 4</td></tr><tr><td>3</td><td>CW/CCW</td></tr><tr><td>4</td><td>1 phase multiple of 1 (up/down count by program)</td></tr><tr><td>5</td><td>1 phase multiple of 2 (up/down count by program)</td></tr><tr><td>6</td><td>1 phase multiple of 1 (up/down count by phase B)</td></tr><tr><td>7</td><td>1 phase multiple of 2 (up/down count by phase B)</td></tr></table></td></tr>
<tr><td>RING _MIN</td><td>DINT</td><td>User-defined minimum value of Ring count
● Range : -2,147,483,648 ~ 2,147,483,647</td></tr>
<tr><td>RING _MAX</td><td>DINT</td><td>User-defined maximum value of Ring count
● Range: -2,147,483,648 ~ 2,147,483,647</td></tr>
<tr><td rowspan="2">Output</td><td>DONE</td><td>BOOL</td><td>Function block execution complete signal
● If this function block is executed without error, DONE is “1” and the opposite case “0”.</td></tr>
<tr><td>STAT</td><td>USINT</td><td>The range which it is displayed to the error status.
● Indicates the error number that occurs during execution of the function block.
● Please refer to 4.3 Error code on the function block.</td></tr>
</table>

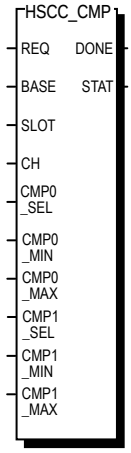
4.2.3 Supplementary function setting function block (HSCC_AUX)

■ This function block sets the supplementary functions.

<table>
<tr><th>Figure</th><th>I/O</th><th>Variable name</th><th>Data type</th><th>Description</th></tr>
<tr><td rowspan="11"> 
</td><td rowspan="9">Input</td><td>REQ</td><td>BOOL</td><td>Function block execution request in the condition of rising edge.
● When this variable is turned “0→1” (rising edge), this function block is executed.</td></tr>
<tr><td>BASE</td><td>USINT</td><td>Base location No.
● Number of base that high-speed counter module is mounted.
● Range
GM4 series : 0 ~ 3 (GM4 -CPUC : 0 ~ 7)
GM6 series : 0 (12 slot base : 0 ~ 1)</td></tr>
<tr><td>SLOT</td><td>USINT</td><td>Slot location No.
● Number of slot that high-speed counter module is mounted.
● Range : 0 ~ 7</td></tr>
<tr><td>CH</td><td>BOOL</td><td>Channel
● “0”: channel 0, “1”: channel 1</td></tr>
<tr><td>AUX</td><td>USINT</td><td>Function selection
● Range : 0 ~ 6
<table>
<tr><th>Value</th><th>Description</th></tr>
<tr><td>0</td><td>no using supplementary function</td></tr>
<tr><td>1</td><td>Count clear function</td></tr>
<tr><td>2</td><td>Count latch function</td></tr>
<tr><td>3</td><td>Sampling count function</td></tr>
<tr><td>4</td><td>Input frequency count function</td></tr>
<tr><td>5</td><td>Rotation count per unit time function</td></tr>
<tr><td>6</td><td>Count disable function</td></tr>
</table></td></tr>
<tr><td rowspan="2">SET_ TIME</td><td rowspan="2">UINT</td><td>Preset time for sampling count function.
● Range : 1 ~ 65,535 (ms)</td></tr>
<tr><td>Preset time for rotation count per unit time function.
● Range : 1 ~ 65,535 (ms)</td></tr>
<tr><td>SET_ PULS</td><td>UINT</td><td>Pulse number per 1 rotation for rotation count per unit time function.
● Range : 0 ~ 65,535 (pulse)</td></tr>
<tr><td>FREQ UNIT</td><td>UINT</td><td>Frequency display unit of input frequency count function
● Range : 0 ~ 3
<table>
<tr><th>Value</th><th>Unit [Hz]</th></tr>
<tr><td>0</td><td>1</td></tr>
<tr><td>1</td><td>10</td></tr>
<tr><td>2</td><td>100</td></tr>
<tr><td>3</td><td>1,000</td></tr>
</table></td></tr>
<tr><td rowspan="2">Output</td><td>DONE</td><td>BOOL</td><td>Function block execution complete signal
● If this function block is executed without error, DONE is “1” and the opposite case “0”.</td></tr>
<tr><td>STAT</td><td>USINT</td><td>The range which it is displayed to the error status.
● Indicates the error number that occurs during execution of the function block.
● Please refer to 4.3 Error code on the function block.</td></tr>
</table>

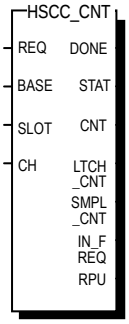
4.2.4 Coincidence output setting function block (HSCC_CMP)

■ This function block sets the coincidence output conditions and values.

<table>
<tr><th>Figure</th><th>I/O</th><th>Variable name</th><th>Data type</th><th>Description</th></tr>
<tr><td rowspan="10"> 
</td><td rowspan="8">Input</td><td>REQ</td><td>BOOL</td><td>Function block execution request in the condition of rising edge.
● When this variable is turned “0→1” (rising edge), this function block is executed.</td></tr>
<tr><td>BASE</td><td>USINT</td><td>Base location No.
● Number of base that high-speed counter module is mounted.
● Range
GM4 series : 0 ~ 3 (GM4 -CPUC : 0 ~ 7)
GM6 series : 0 (12 slot base : 0 ~ 1)</td></tr>
<tr><td>SLOT</td><td>USINT</td><td>Slot location No.
● Number of slot that high-speed counter module is mounted.
● Range : 0 ~ 7</td></tr>
<tr><td>CH</td><td>BOOL</td><td>Channel
● “0”: channel 0, “1”: channel 1</td></tr>
<tr><td>CMP0 _SEL/ CMP1 _SEL</td><td>USINT</td><td>Coincidence output selection
● Range : 0 ~ 6
<table>
<tr><th>Value</th><th>Symbol</th><th>Description</th></tr>
<tr><td>0</td><td><</td><td>Single comparison : Less than</td></tr>
<tr><td>1</td><td>≤</td><td>Single comparison : Equal or less than</td></tr>
<tr><td>2</td><td>=</td><td>Single comparison : Equal</td></tr>
<tr><td>3</td><td>≥</td><td>Single comparison : Equal or more than</td></tr>
<tr><td>4</td><td>></td><td>Single comparison : More than</td></tr>
<tr><td>5</td><td>≤ ≤</td><td>Section comparison : Including</td></tr>
<tr><td>6</td><td>≥ ≤</td><td>Section comparison : Not including</td></tr>
</table></td></tr>
<tr><td>CMP0 _MIN/ CMP1 _MIN</td><td>DINT</td><td>Compared value for coincidence output selection 0~4 or
user-defined minimum value for section comparison. (coincidence output selection : 5,6)
● Range: -2,147,483,648 ~ 2,147,483,647</td></tr>
<tr><td>CMP0 _MIN/ CMP1 _MAX</td><td>DINT</td><td>User-defined maximum value for section comparison. (coincidence output selection : 5,6)
● Range: -2,147,483,648 ~ 2,147,483,647</td></tr>
<tr><td rowspan="2">Output</td><td>DONE</td><td>BOOL</td><td>Function block execution complete signal
● If this function block is executed without error, DONE is “1” and the opposite case “0”.</td></tr>
<tr><td>STAT</td><td>USINT</td><td>The range which it is displayed to the error status.
● Indicates the error number that occurs during execution of the function block.
● Please refer to 4.3 Error code on the function block.</td></tr>
</table>

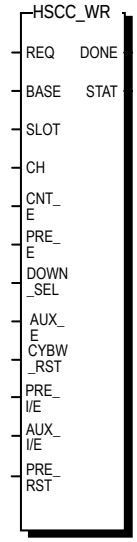
4.2.5 Count reading function block (HSCC_CNT)

■ This function block reads the count value of the current and the supplementary functions.

Figure	I/O	Variable name	Data type	Description
	Input	REQ	BOOL	Function block execution request in the condition of high level. ● When this variable is "1", this function block is executed.
		BASE	USINT	Base location No. ● Number of base that high-speed counter module is mounted. ● Range GM4 series : 0 ~ 3 (GM4 -CPUC : 0 ~ 7) GM6 series : 0 (12 slot base : 0 ~ 1)
		SLOT	USINT	Slot location No. ● Number of slot that high-speed counter module is mounted. ● Range : 0 ~ 7
		CH	BOOL	Channel. ● "0": channel 0, "1": channel 1
	Output	DONE	BOOL	Function block execution complete signal ● If this function block is executed without error, DONE is "1" and the opposite case "0".
		STAT	USINT	The range which it is displayed to the error status. ● Indicates the error number that occurs during execution of the function block. ● Please refer to 4.3 Error code on the function block.
		CNT	DINT	Current count value. ● Output range : -2,147,483,648 ~ 2,147,483,647
		LTCH_CNT	DINT	Latched count value ● Output range: -2,147,483,648 ~ 2,147,483,647
		SMPL_CNT	DINT	Sampling count value ● Output range: -2,147,483,648 ~ 2,147,483,647
		IN_FREQ	UDINT	Input frequency count value ● Output range : 0 ~ 2,147,483,647
		RPU	UDINT	Rotation count value per unit time ● Output range : 0 ~ 2,147,483,647

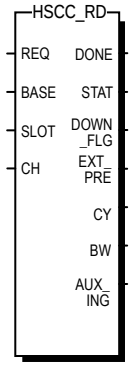
4.2.6 Operating information writing function block (HSCC_WR)

■ This function block writes count enable command, preset enable command, up/down count enable command, gate enable command etc. to PLC.

Figure	I/O	Variable name	Data type	Description
	Input	REQ	BOOL	Function block execution request in the condition of high level. ● When this variable is "1", this function block is executed.
		BASE	USINT	Base location No. ● Number of base that high-speed counter module is mounted. ● Range GM4 series : 0 ~ 3 (GM4 -CPUC : 0 ~ 7) GM6 series : 0 (12 slot base : 0 ~ 1)
		SLOT	USINT	Slot location No. ● Number of slot that high-speed counter module is mounted. ● Range : 0 ~ 7
		CH	BOOL	Channel. ● "0": channel 0, "1": channel 1
		CNT_E	BOOL	Count enable command ● "0": Count disable. ● "1": Count enable.
		PRE_E	BOOL	Preset enable command ● "0": Preset disable. ● "1": Preset enable.
		DOWN_SEL	BOOL	Setting up count or down count by program ● "0": Up count. ● "1": Down count.
		AUX_E	BOOL	Supplementary function enable or disable command. ● "0": Supplementary function disable. ● "1 ": Supplementary function enable.
		CYBW_RST	BOOL	Carry/ Borrow reset command. ● "0": Carry / borrow state is retained. ● "1": Carry / borrow is reset.
		PRE_I/E	BOOL	Preset enable method selection (the internal function block or the external terminal input) ● "0": Preset enable by the internal function block. ● "1": Preset enable by the external terminal input.
		AUX_I/E	BOOL	Supplementary function enable method selection (the internal function block or the external terminal input) ● "0": Supplementary function enable by the internal function block. ● "1": Supplementary function enable by the external terminal input.
		PRE_RST	BOOL	Control the detection status of the external preset input signal. ● "0": preset flag is retained as "1". ● "1": preset flag is reset. (0)
	Output	DONE	BOOL	Function block execution complete signal ● If this function block is executed without error, DONE is "1" and the opposite case "0".
		STAT	USINT	The range which it is displayed to the error status. ● Indicates the error number that occurs during execution of the function block. ● Please refer to 4.3 Error code on the function block.

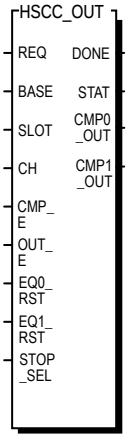
4.2.7 Operating information reading function block (HSCC_RD)

■ This function block reads Carry, Borrow, Preset flag, Function flag etc from PLC.

Figure	I/O	Variable name	Data type	Description
	Input	REQ	BOOL	Function block execution request in the condition of high level. ● When this variable is "1", this function block is executed.
		BASE	USINT	Base location No. ● Number of base that high-speed counter module is mounted. ● Range GM4 series : 0 ~ 3 (GM4 -CPUC : 0 ~ 7) GM6 series : 0 (12 slot base : 0 ~ 1)
		SLOT	USINT	Slot location No. ● Number of slot that high-speed counter module is mounted. ● Range : 0 ~ 7
		CH	BOOL	Channel. ● "0": channel 0, "1": channel 1
	Output	DONE	BOOL	Function block execution complete signal ● If this function block is executed without error, DONE is "1" and the opposite case "0".
		STAT	USINT	The range which it is displayed to the error status. ● Indicates the error number that occurs during execution of the function block. ● Please refer to 4.3 Error code on the function block.
		DOWN_FLG	BOOL	Up/down count flag ● "0": In operation of up count ● "1": In operation of down count
		EXT_PRE	BOOL	Preset flag (occurred by the external terminal input) ● "0": Preset input signal is Off (by the external terminal input) ● "1": Preset input signal is On (by the external terminal input)
		CY	BOOL	Carry ● "0": no carry occurred. ● "1": carry occurred.
		BW	BOOL	Borrow ● "0": no borrow occurred. ● "1": borrow occurred.
		AUX_ING	BOOL	Supplementary function run signal ● "0": Supplementary function run signal is Off. ● "1": Supplementary function run signal is On.

4.2.8 Coincidence output function block (HSCC_OUT)

■ This function block writes coincidence output enable command, comparison enable command to PLC and reads coincidence output state from PLC.

Figure	I/O	Variable name	Data type	Description
	Input	REQ	BOOL	Function block execution request in the condition of high level. ● When this variable is "1", this function block is executed.
		BASE	USINT	Base location No. ● Number of base that high-speed counter module is mounted. ● Range GM4 series : 0 ~ 3 (GM4 -CPUC : 0 ~ 7) GM6 series : 0 (12 slot base : 0 ~ 1)
		SLOT	USINT	Slot location No. ● Number of slot that high-speed counter module is mounted. ● Range : 0 ~ 7
		CH	BOOL	Channel. ● "0": channel 0, "1": channel 1
		CMP_E	BOOL	Comparison enable command. ● "0": Comparison disable. ● "1": Comparison enable.
		OUT_E	BOOL	Coincidence output enable command. ● "0": Coincidence output disable of OUT0/OUT1 ● "1": Coincidence output enable of OUT0/OUT1
		EQ0_RST	BOOL	Coincidence output (occurred by "equal" in CMP0_SEL of input variable of HSCC_CMP function block) reset command for OUT0. ● "0": Coincidence output occurred by "equal" is retained as "1". ● "1": Coincidence output occurred by "equal" is reset.(0)
		EQ1_RST	BOOL	Coincidence output (occurred by "equal" in CMP1_SEL of input variable of HSCC_CMP function block) reset command for OUT1. ● "0": Coincidence output occurred by "equal" is retained as "1". ● "1": coincidence output occurred by "equal" is reset.(0)
		STOP_SEL	BOOL	The status of coincidence output when the operation mode of PLC CPU module is stop mode ● "0": Coincidence output disable of OUT0/OUT1 ● "1": Coincidence output enable of OUT0/OUT1
	Output	DONE	BOOL	Function block execution complete signal ● If this function block is executed without error, DONE is "1" and the opposite case "0".
		STAT	USINT	The range which it is displayed to the error status. ● Indicates the error number that occurs during execution of the function block. ● Please refer to 4.3 Error code on the function block.
		CMP0_OUT	BOOL	Coincidence output state of OUT0. ● "0": coincidence output of OUT0 is Off. ● "1": coincidence output of OUT0 is On.
		CMP1_OUT	BOOL	Coincidence output state of OUT1. ● "0": coincidence output of OUT1 is Off. ● "1": coincidence output of OUT1 is On.

4.3 Error Code on the Function Block

■ The errors on the output variable “STAT” of function blocks and the resolutions in accordance with them is shown below.

STAT No.	Descriptions	Management
0	Operating with no fault	-
1	The base number is not within the proper setting range.	Correct the base number within the proper range. ● Setting range GM4 series : 0 ~ 3 (GM4 -CPUC : 0 ~ 7) GM6 series : 0 (12 slot base : 0 ~ 1)
2	H/W error of the base	Contact with the service center.
3	The slot number is not within the proper setting range	Correct the slot number within the proper range. ● Setting range : 0 ~ 7
4	The specified slot is empty	Mount the high speed counter module to the specified slot
5	The module mounted isn't the high speed counter module	Mount the high speed counter module to the specified slot
6	-	-
7	H/W error of the high speed counter module	Contact with the service center.
8	The high speed counter module's internal buffer memory error	Contact with the service center.
9	-	-

Chapter 5 GM Programming

5.1 Programming Example

■ If not especially noted, this section explains programming examples in reference with the G4F – HO1C that is mounted onto the system given below.

■ System configuration

GM4-PA2A	GM4-CPUA	G4I-D22A	G4F-HO1C	G4Q-TR2A	G4Q-TR2A
Power	CPU	Slot0	Slot1	Slot2	Slot3

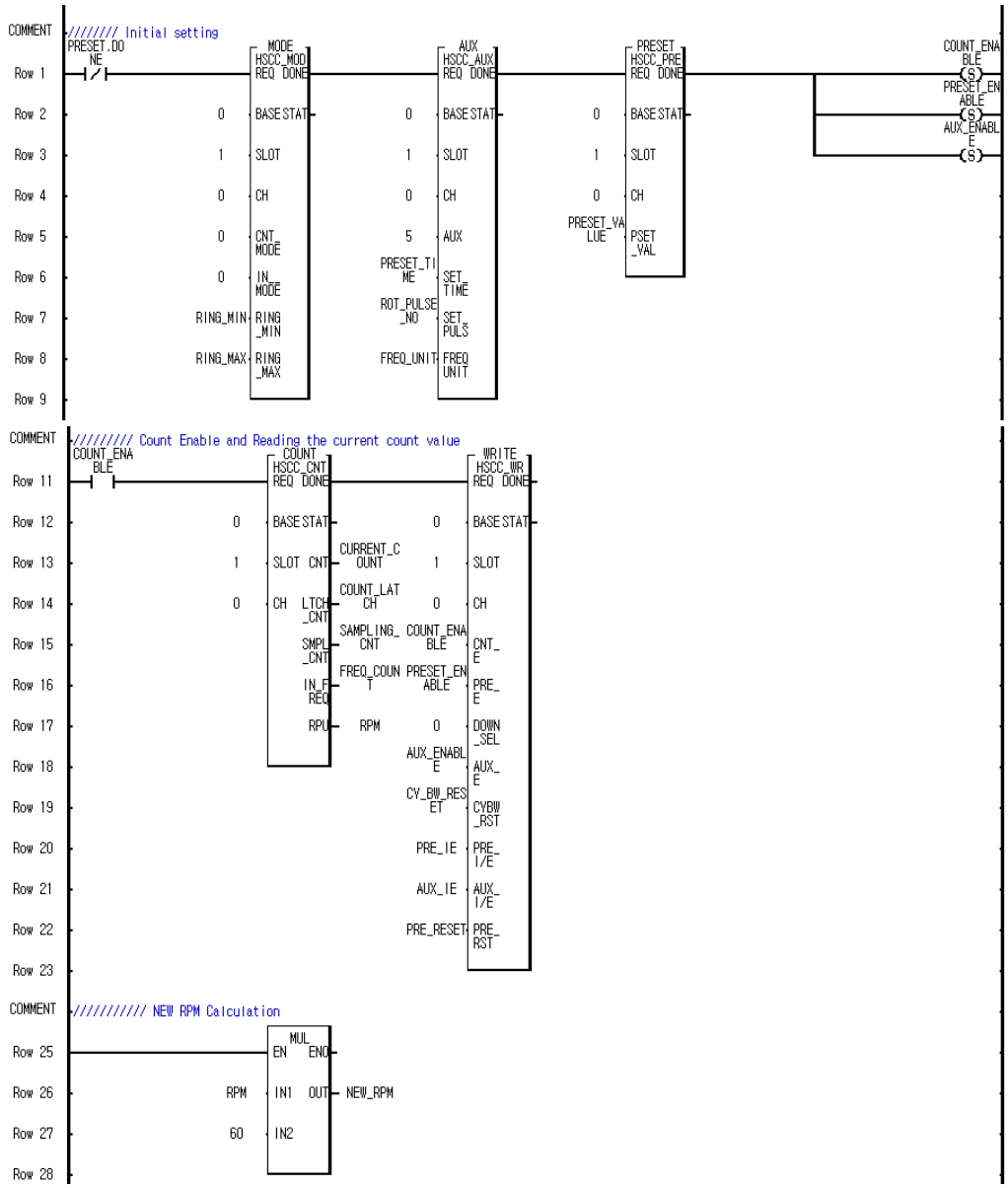
5.1.1 Reading the current count value and calculating RPM

■ Count mode is 2 phase mulptiply of 1 and this program calculates RPM count value.

■ Operation description : If operation mode of PLC CPU module is RUN mode, initial setting (count mode, pulse input mode, supplementary function setting etc.) is completed and it is done also to count enable, preset enable and supplementary enable.

■ Setting Data : Supplementary function = 5 (rotation count per unit time), Preset time = 1,000ms, Preset value = 0, Frequency unit = 0 (1Hz), Pulse no. per 1 rotation = user defined.

[Program]



Remark

Here, NEW_RPM value is RPM data which it is revised per 1 second.

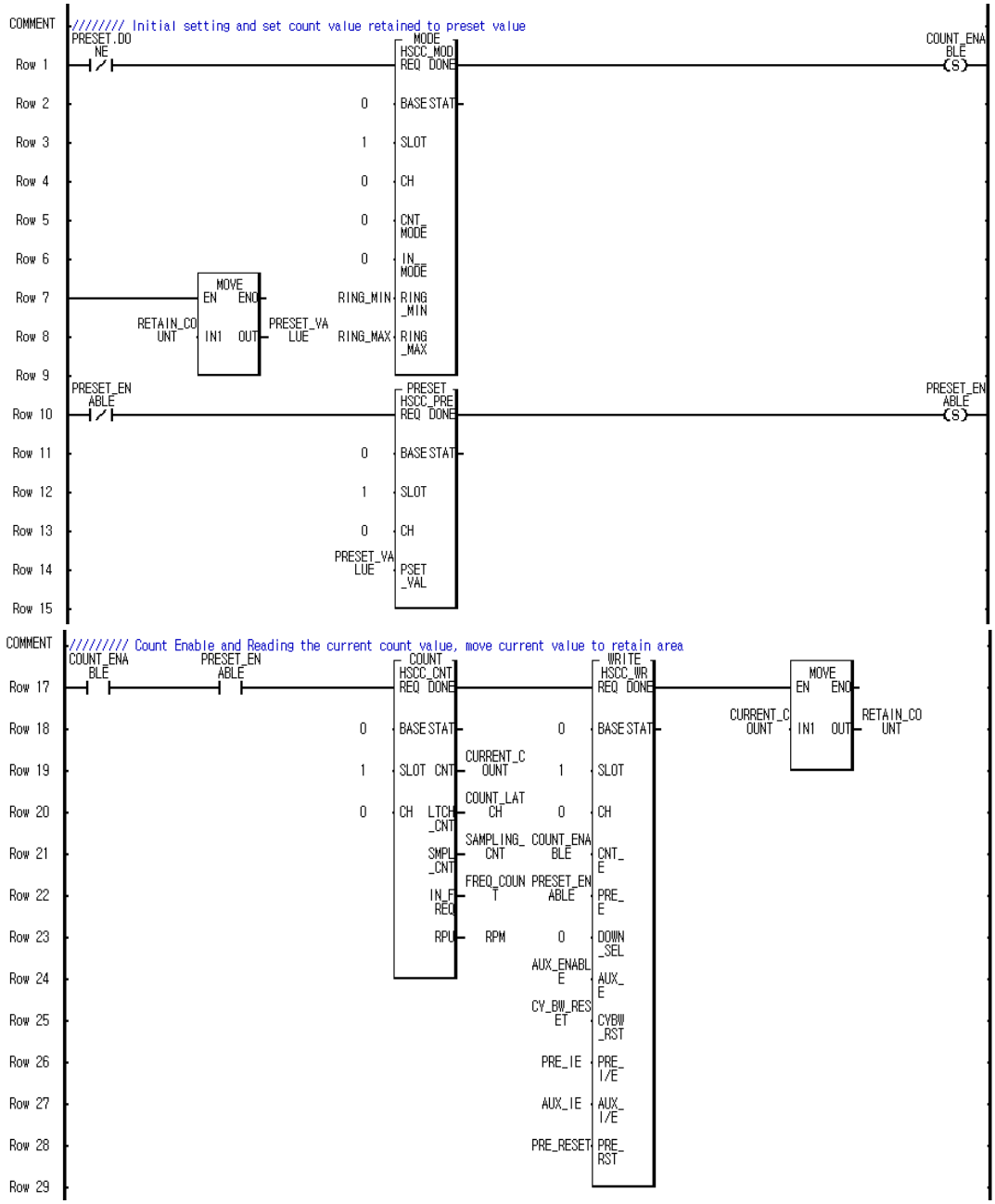
5.1.2 Saving the retain value of current count value

■ When the operation mode of PLC CPU is RUN, the current value is always moved the retain area continuously.

And when PLC Power is changed to On, the count value of that time is saved the retain value.

■ You have to set the Variable Kind of “RETAIN_COUNT” to “VAR_RETAIN” in this program.

[Program]



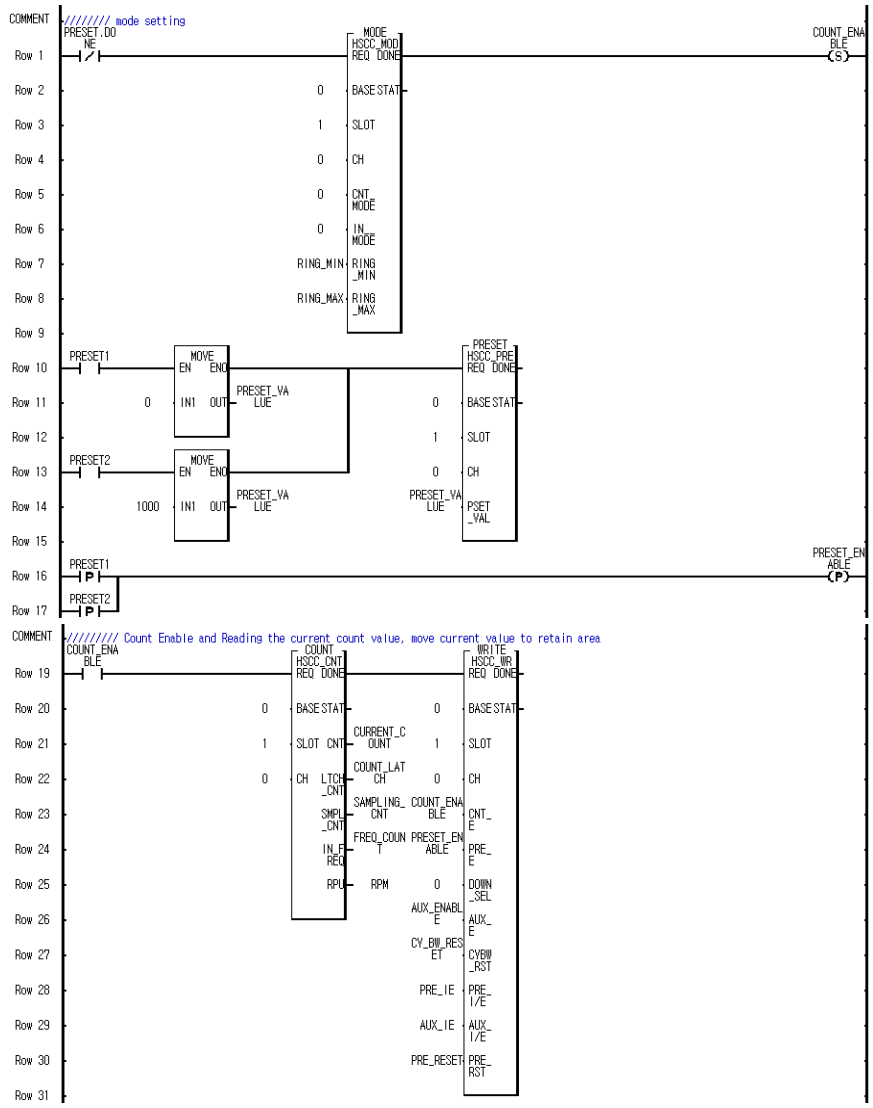
5.1.3 Preset setting

■ This program is that it is possible to set the preset value of two kind.

■ Operating description : if PRESET1 is On, it is set “0” as preset value,

if PRESET2 is On, it is set “1000” as preset value

[Program]



2 phase multiply of 1
Linear count
set the count enable

PRESET1 On →
Preset value = 0
PRESET2 On →
Preset value = 1,000

Preset enable On

Reading the current count value and writing the setting condition

Remark

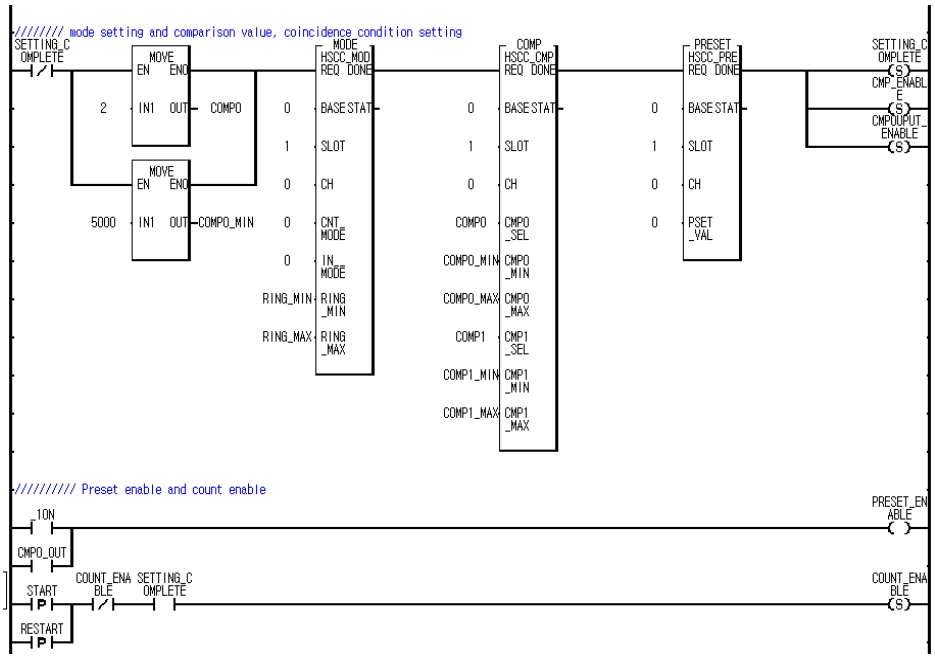
If you want to use the external preset input, you have to set “PRE_I/E” of HSCC_WR function block to “1” and input the external preset input signal.

5.1.4 Coincidence output setting

■ This program is that it set the comparison value and the comparison condition about comparion ouput 0 of channel 0.

■ Operating description : If start switch is On, count is enabled and it is counted until 5,000 (comparison value), If the current value is 5,000, then comparison output 0 of channe 0 is On and EQ0_RST(equal reset signal) of HSCC_OUT function block is On. If restart switch is On, the current value is increased to 5,000.

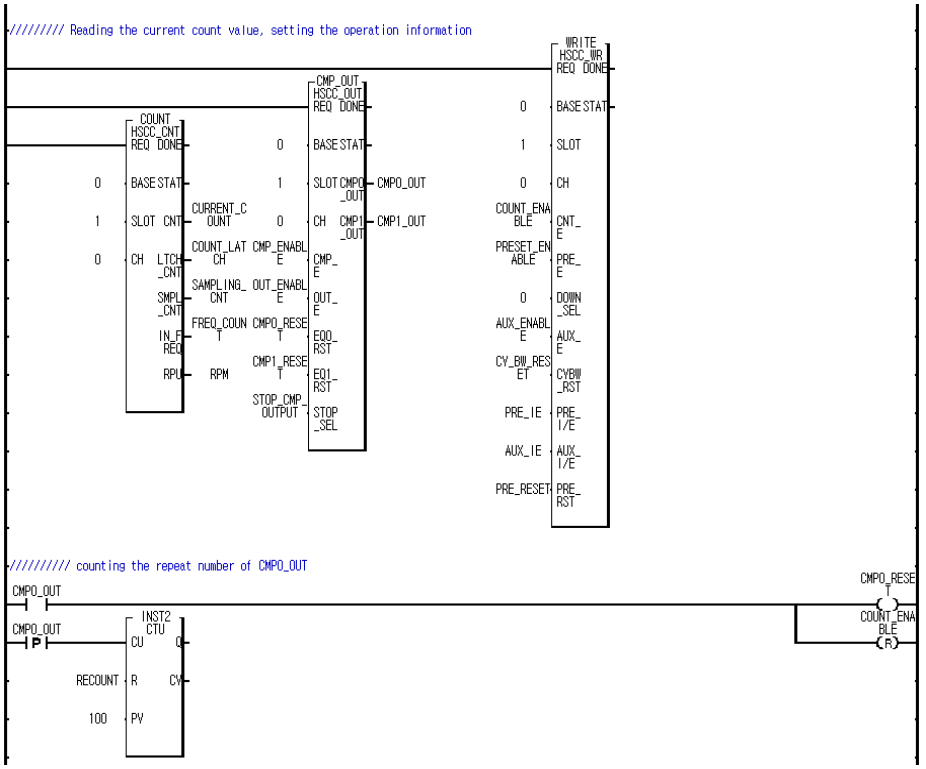
[Program]



Comparison condition = 2 (equal condition)
Comparison value = 5,000
2 phase multiply of 1
Linear count
Preset value = 0
Set the comparison enable
Set the external comparison output

Preset enable

Set the count enable



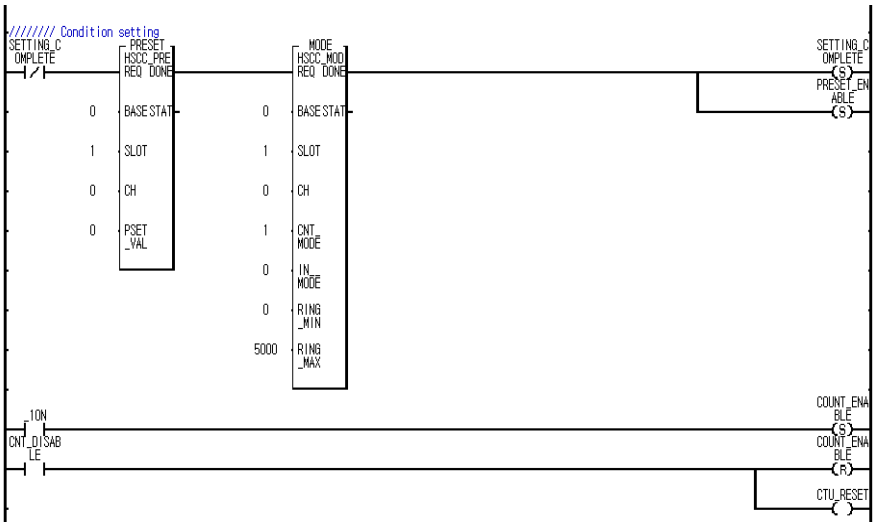
When CMP0_OUT is On then the equal reset signal (CMP0_RESET) is On
Count the number of times which CMP0_OUT is On

5.1.5 Carry/Borrow Reset

■ This program is that it resets the carry signal after setting ring count.

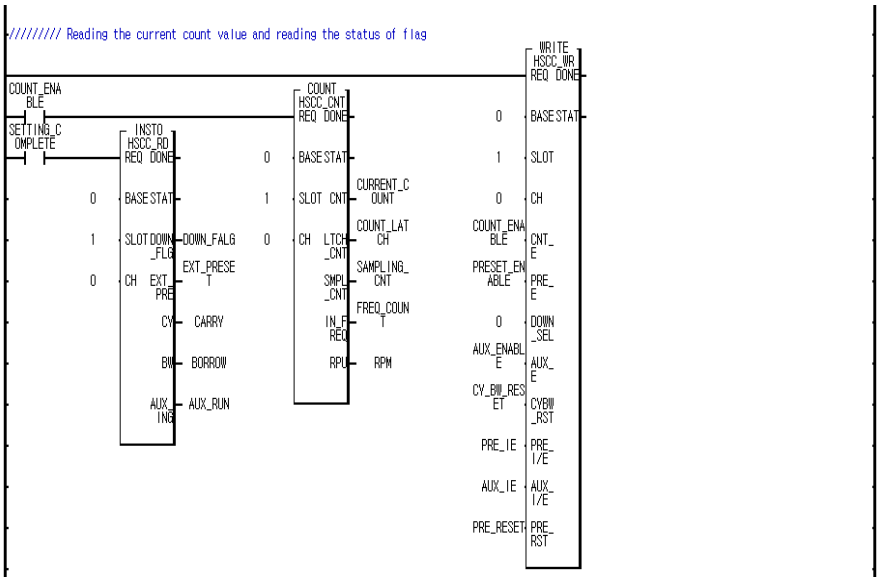
■ Operating description: If setting is completed, it starts count. If it is greater than maximum value (5,000) of ring count, Then carry signal is occurred and it repeats this process 100 times.

[Program]



2 phase multiply of 1
Linear count(0~5,0000)
Preset value = 0
Set the preset enable

Set the count enable
Reset carry signal

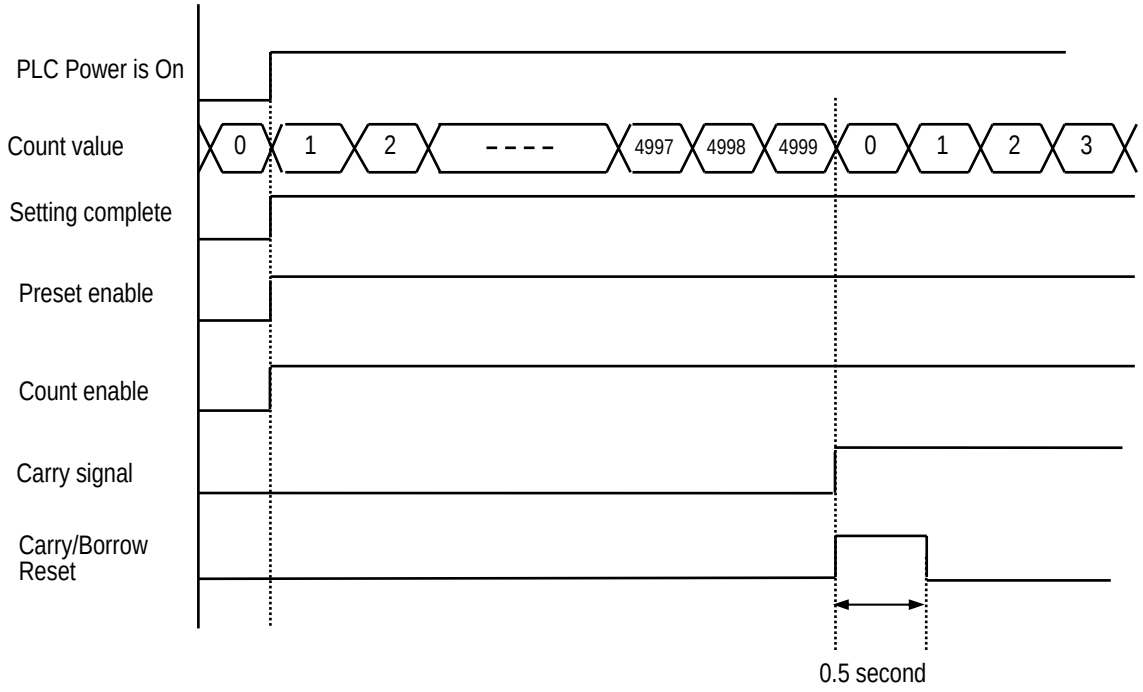


Writing the operation information
Reading the current count value
Reading the status of carry

Reset carry signal after 0.5 second when carry is occurred

Count the number of times carry is occurred

[Flow Chart]

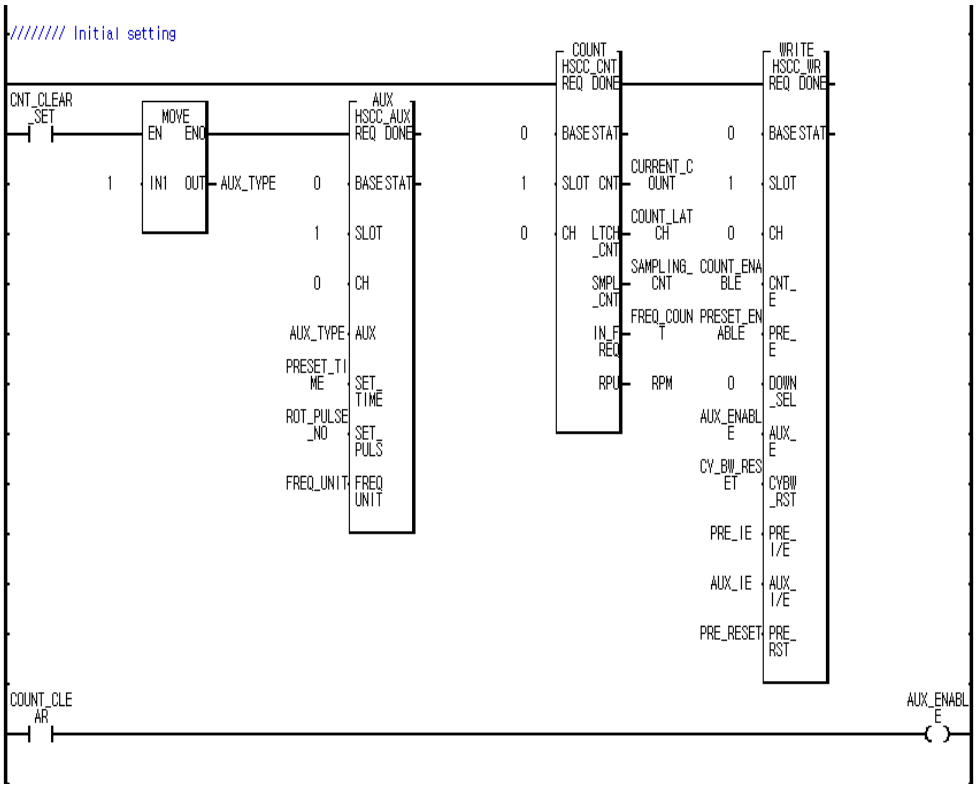

PLC Power is On
Count value
0
1
2
– – – –
4997
4998
4999
0
1
2
3
Setting complete
Preset enable
Count enable
Carry signal
Carry/Borrow
Reset
0.5 second

5.1.6 Supplementary function setting

1) Count clear

■ This function clears the current count value when the supplementary function enable command ("AUX_E" input signal of HSCC_WR function block) is On.

■ Operating procedure: CNT_CLEAR_SET is On -> Function selection (AUX_TYPE) =1 (count clear mode), COUNT_CLEAR is On -> function enable command (AUX_ENABLE) is On.



Remark

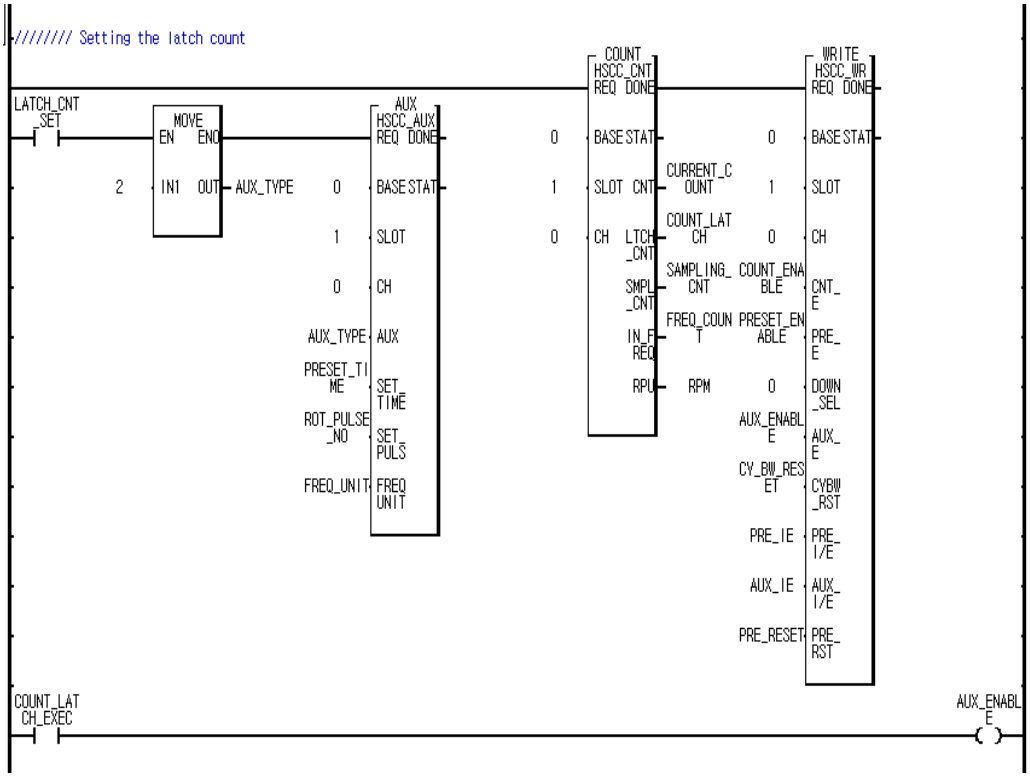
Count clear function is executed at every rising input condition of the HSCC_AUX function block.

2) Count latch

■ This function latches the current count value and stores in the buffer LTCH_CNT of HSCC_CNT function block when the supplementary function enable command(AUX_E of HSCC_WR function block) is On.

■ Operating procedure: LATCH_CNT_SET is On -> Function selection = 2 , supplementary function enable command is On.

[Program]



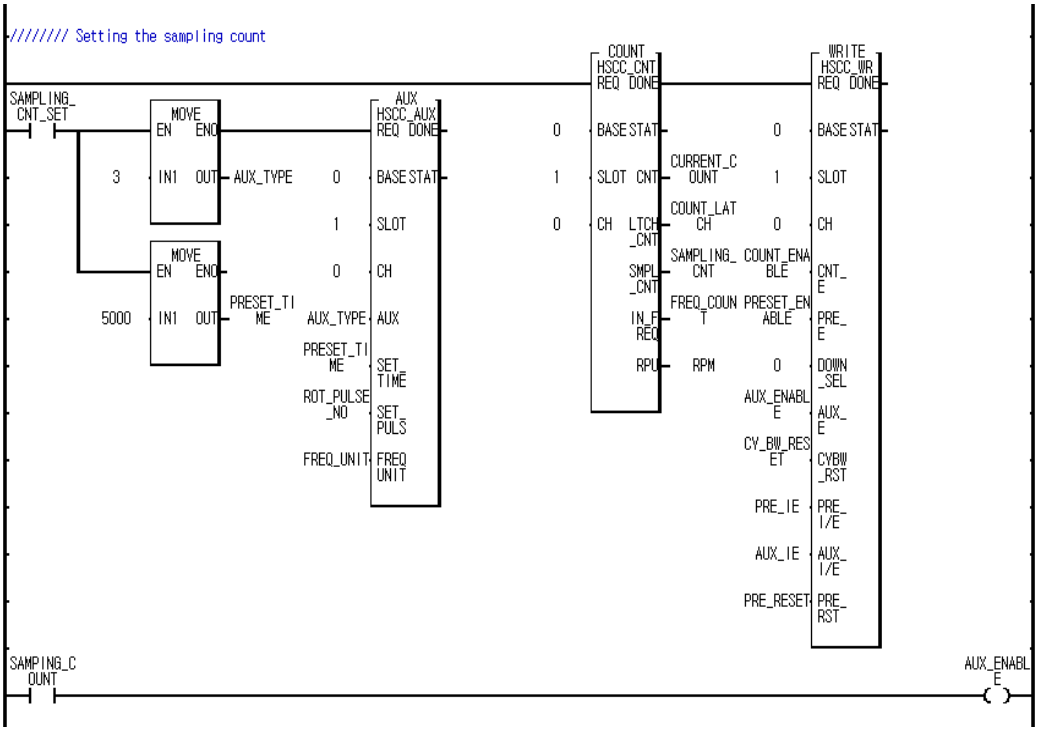
Remark

Count latch function is executed at every rising input condition of the HSCC_AUX function block

3) Sampling count

■ This function counts during the preset time and stores in the buffer (SMPL_CNT of HSCC_CNT function block) it when the function enable command (AUX_E of HSCC_WR function block) is On.

■ Operating procedure: SAMPLING_CNT_SET is On -> Function selection (AUX_TYPE) = 3, Preset time = 5000ms (5second), function enalble command (AUX_E) On.



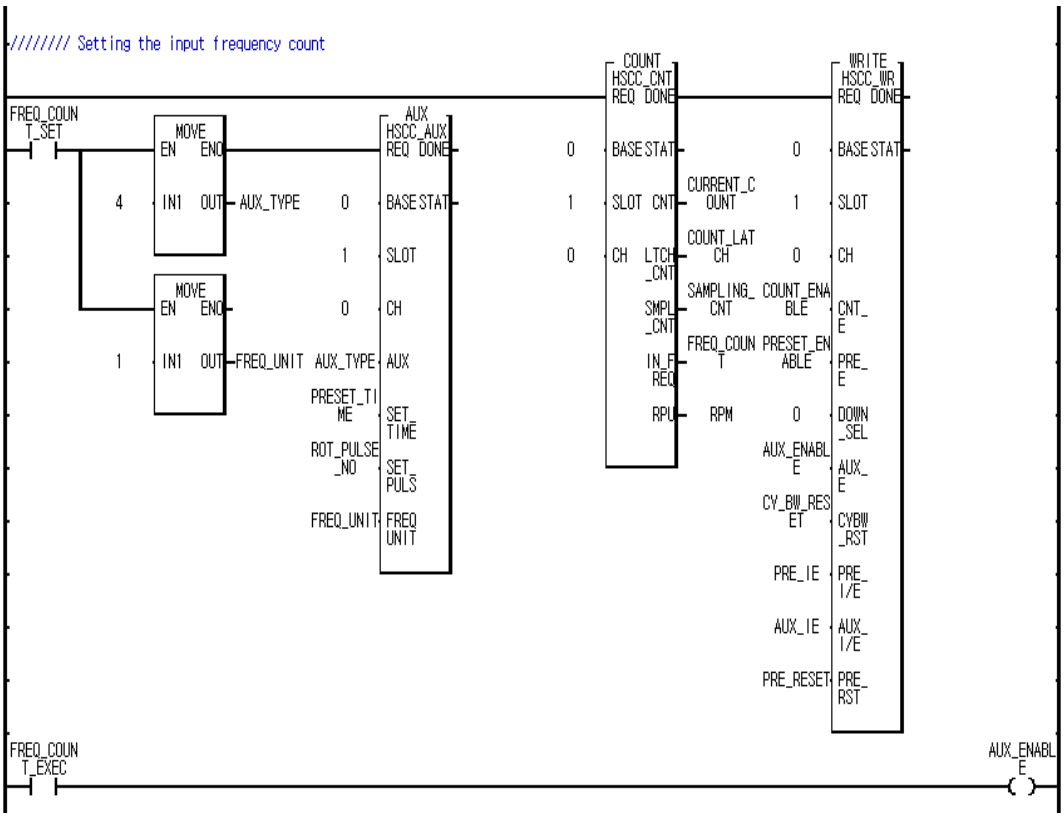
Remark

Sampling count function is executed at every rising input condition of the function enable command during the preset time.

4) Input frequency count

■ This program is that it is displayed to IN_FREQ of HSCC_CNT function block as setting frequency unit.

■ Operating procedure: FREQ_COUNT_SET is ON -> Function selection(AUX_TYPE) =4 (input frequency count), function enable command (AUX_E) is On.



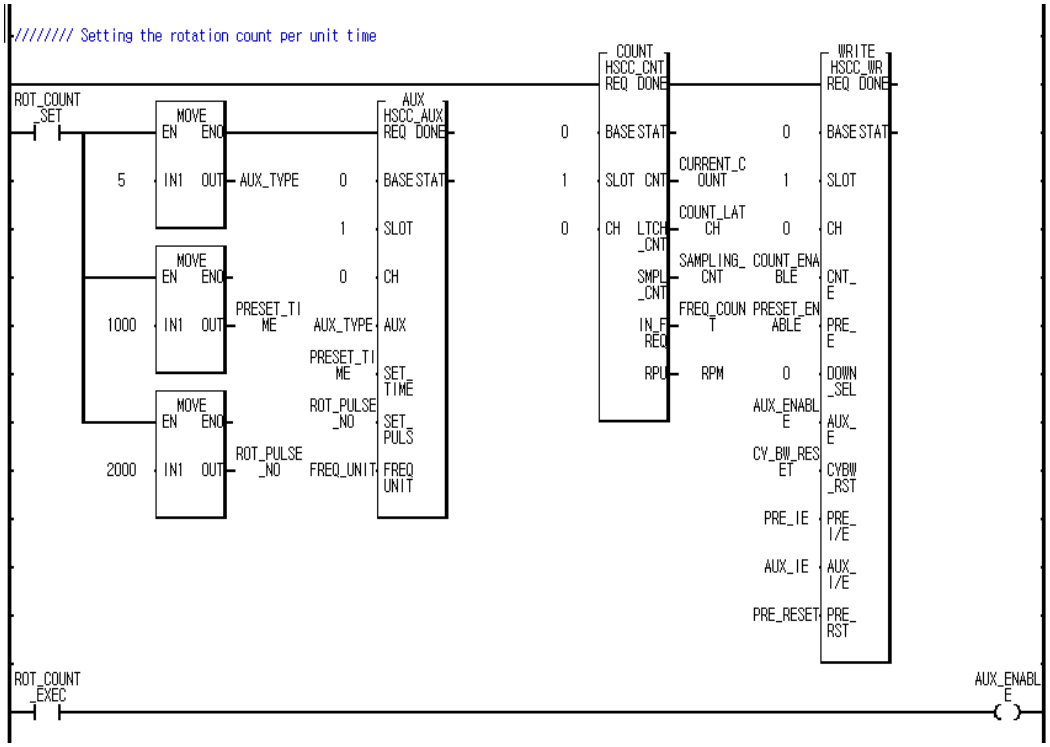
Remark

1) Input frequency count function is executed during the function enable command (AUX_ENABLE) is On.
2) It is displayed as frequency unit of 10Hz because FREQ_UNIT is “1”.
(0 : 1Hz, 1:10Hz, 2:100Hz, 3:1,000Hz)

5) Rotation count per unit time

■ This program is that it is displayed to RPU of HSCC_CNT function block as rotation count per unit time by preset time and rotation number per 1 rotation.

■ Operating procedure: ROT_COUNT_SET is On -> Function selection (AUX) =5 (rotation count per unit time), SET_TIME (Preset time) = 1,000 (1second), SET_PULS (pulse number per 1 rotation) = 2,000, function enable command (AUX_E) is On.



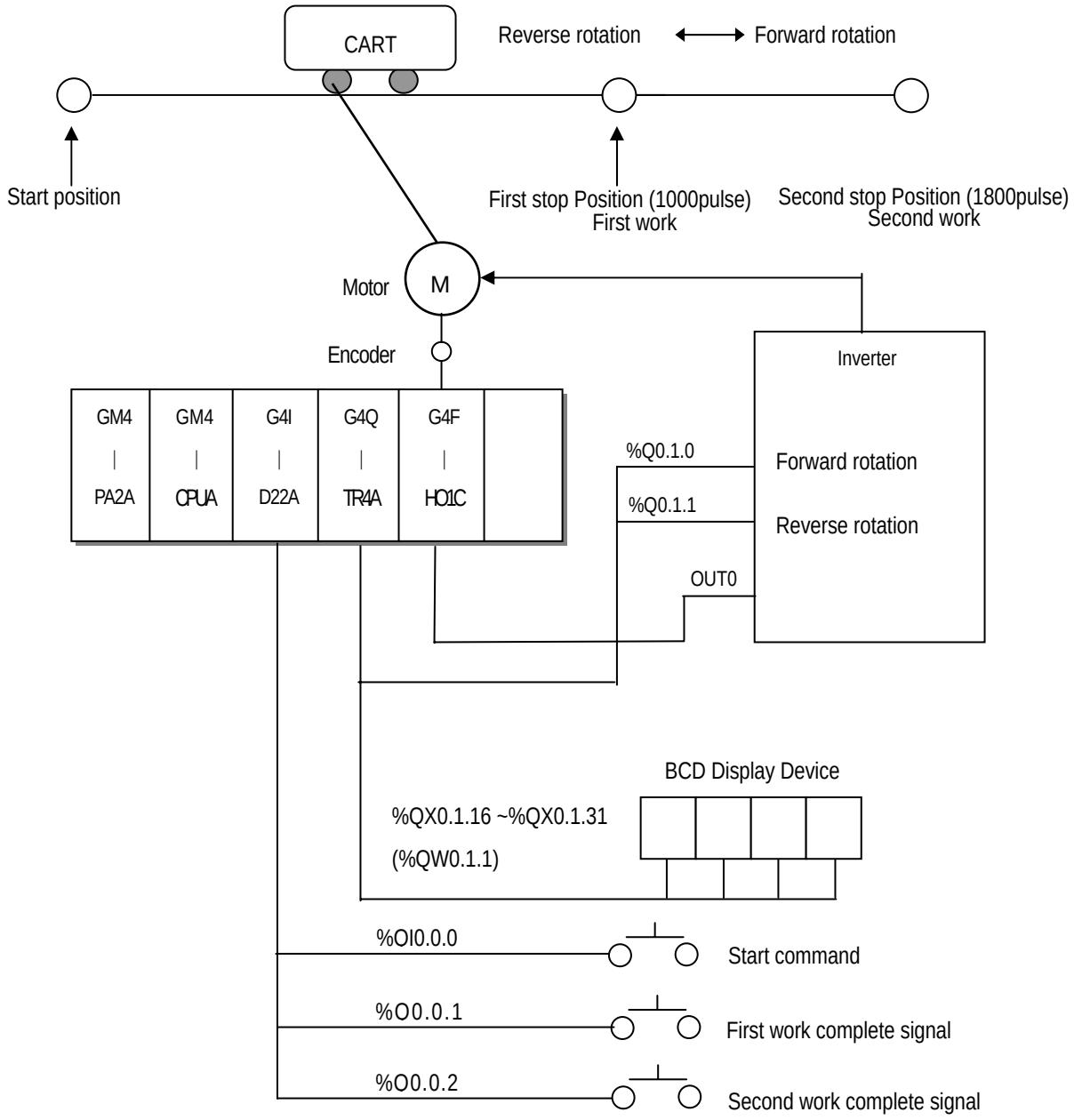
Remark

1) Rotation count per unit time is only executed during the function enable command is On.
2) Because preset time is set to 1000ms, it is revised per 1 second to RPU value which is displayed.

5.2 Application Examples

5.2.1 Program for moving the cart

■ System Configuration



■ Operation Description

- The motor for moving the cart rotates with start command, and makes the cart stop at the first stop position with the High-speed count module counting the encoder signals from the motor.

Then, if the first work complete signal turns On, the motor moves the cart to stop at the second stop position.

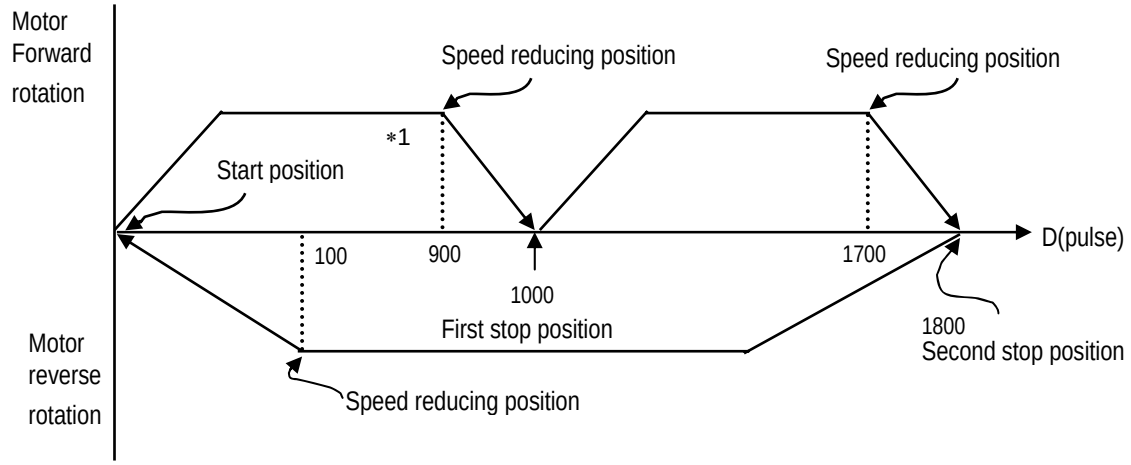
When the second work complete signal turns On, the motor return the cart to the start position.

■ Input/Output Signal Allocation

%I0.0.0 : Start Command
%I0.0.1 : 1'st Work Complete Signal
%I0.0.2 : 2'nd Work Complete Signal
} Input

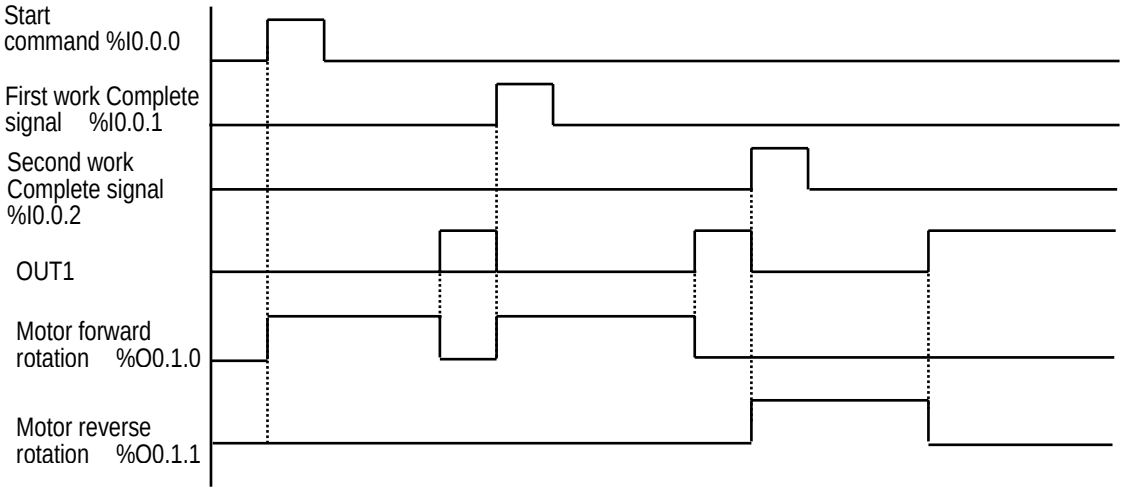
%Q0.1.0 : Motor forward rotation signal (On : forward rotation , Off : Stop)
%Q0.1.1 : Motor reverse rotation signal (On : reverse rotation, Off : Stop)
%Q0.1.16 - %Q0.1.31 : Indicates the current count value(BCD) of the high-speed counting module.
} Output

■ Operation figure

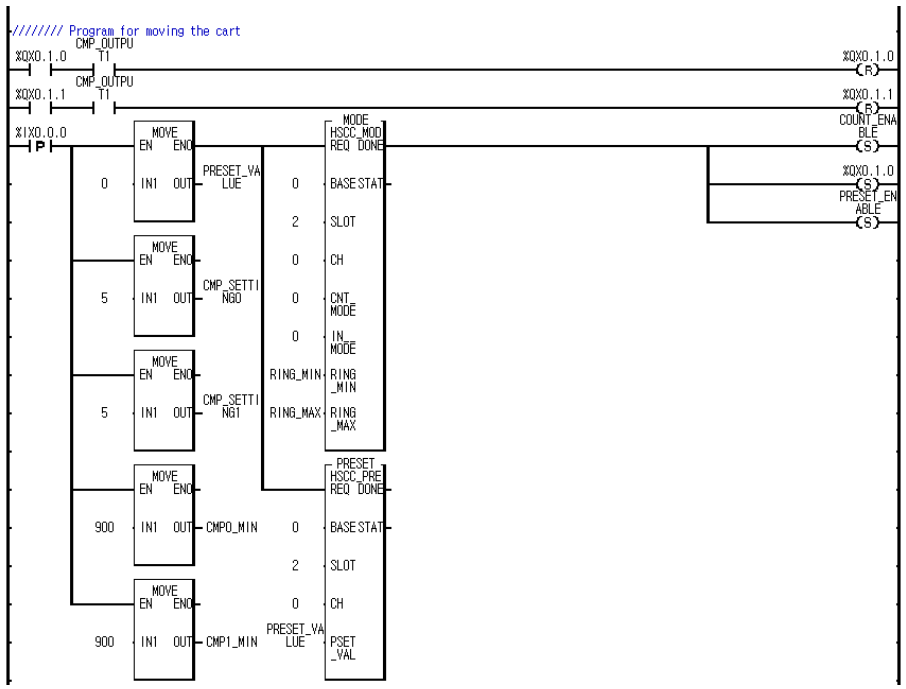


*1 ▸ 100 (Difference between stop position and speed reducing position) is an interval delayed by reducing timing of the inverter

■ Operation Timing

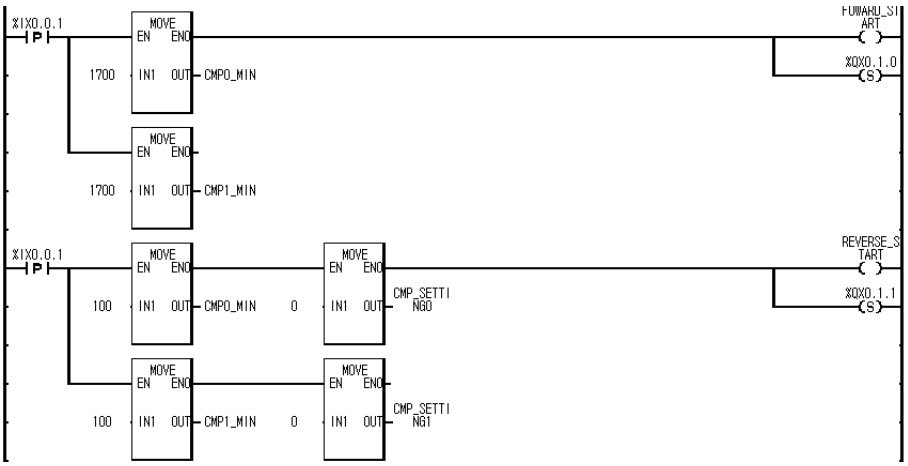


■Program



Motor reverse rotation stops when speed-reducing position is passed

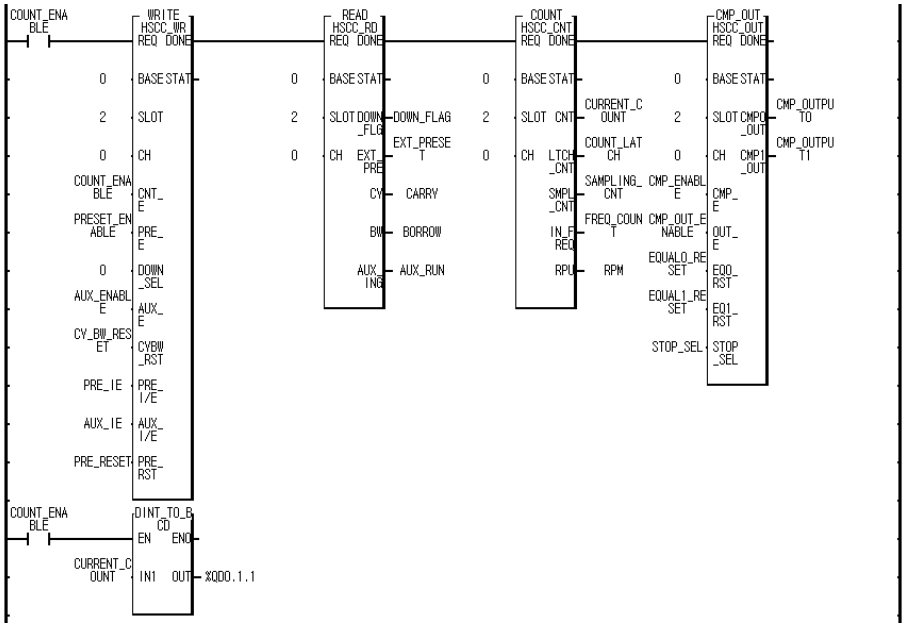
If start command is ON,
PRE_VALUE=0
USER1 = 900



When the first work is completed, USER1=1700 and the motor starts forward rotation.

When the first work is completed, USER1=100 and the motor starts reverse rotation.

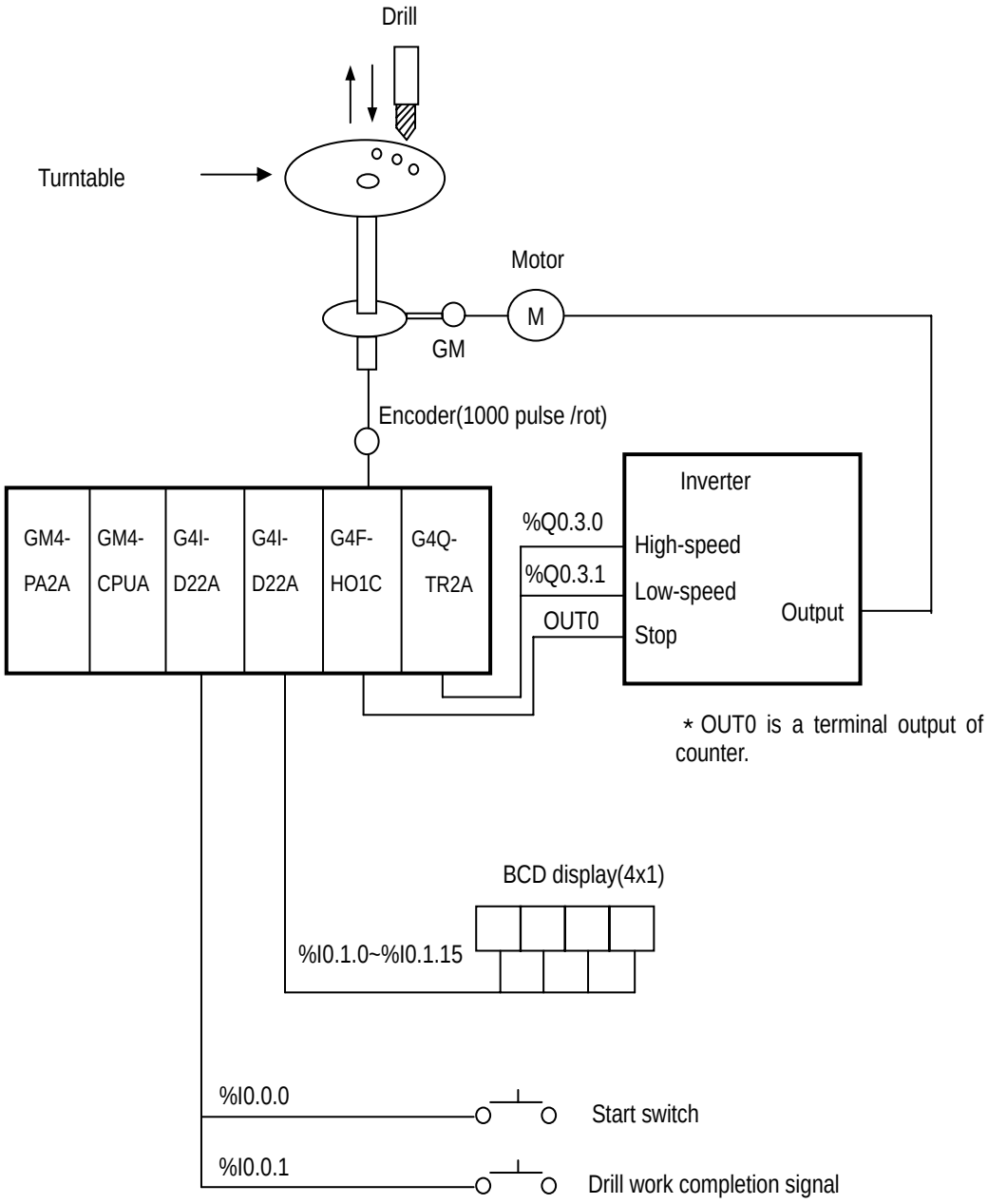
When first or second works or start command is completed, USER1 is changed.



Reading the count value when COUNT_ENABLE is On.

5.2.2 Turntable control program

■ System configuration

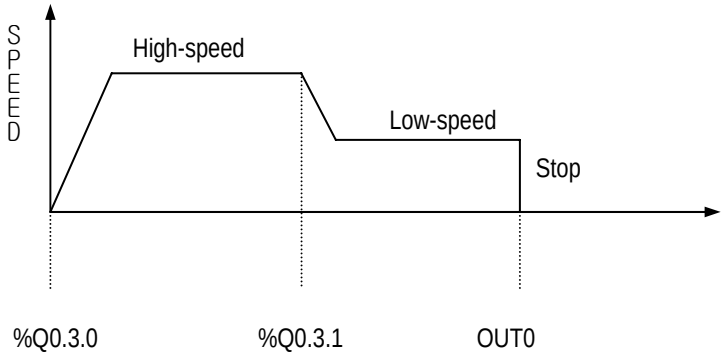


■ Operation description

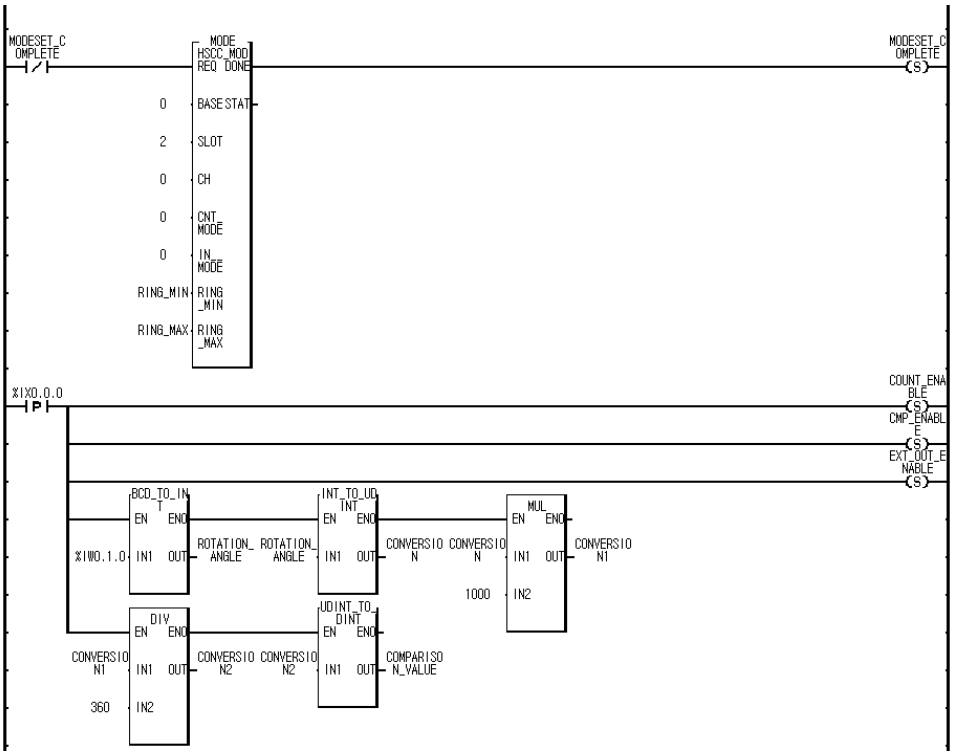
If the start switch is pushed, the turntable rotates the preset angle (60 ˚) and stops.

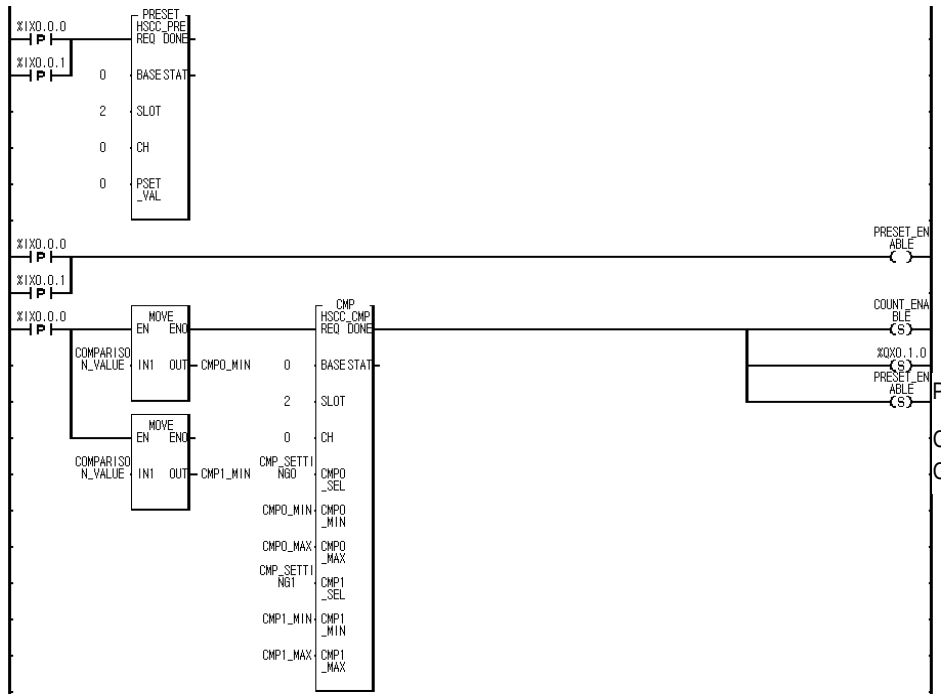
When the first drill work completion signal is On, again the turntable rotates 60 ˚. 6 times work like this is repeated

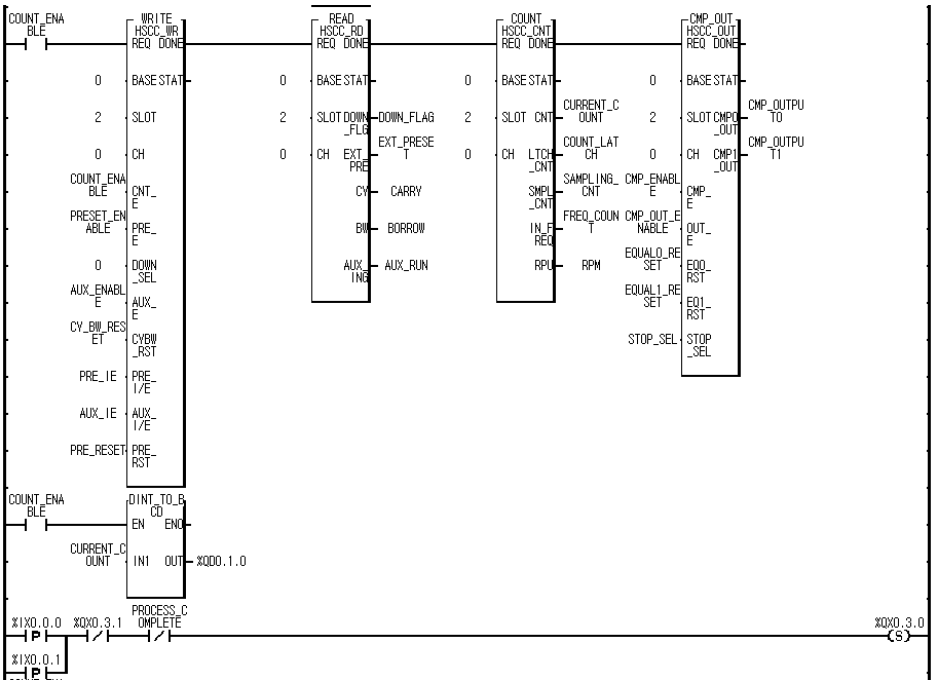
■ Operation figure

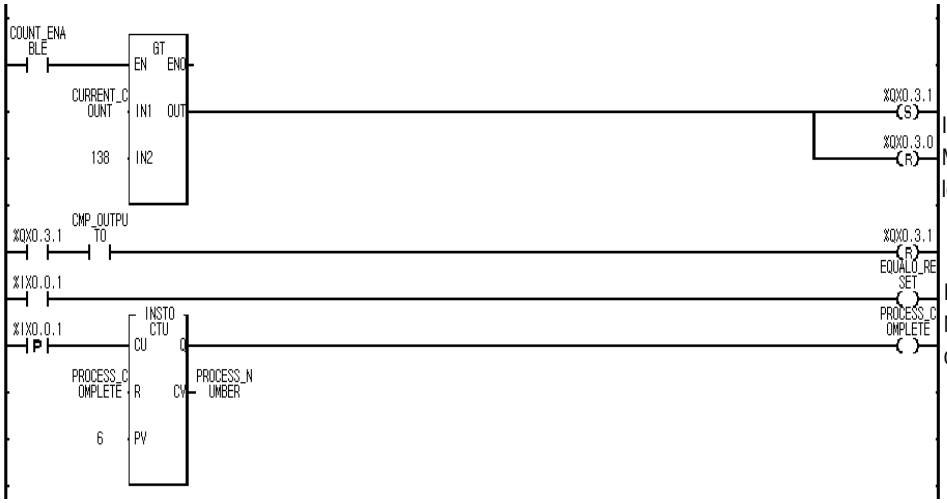


■ Program




%IX0.0.0
%IX0.0.1
PRESET_HSCC_PRE
REQ DONE
0 BASE STAT
2 SLOT
0 CH
0 PSET_VAL
PRESET_ENABLE
MOVE
EN ENO
COMPARISON_VALUE IN1 OUT CMP0_MIN
CMP1_MIN
CMP_HSCC_CMP
REQ DONE
CMP0_MIN
CMP_SETTING0
CMP1_MIN
CMP_SETTING1
COUNT_ENABLE
%QX0.1.0
Preset enable command On
CMP_SETTING0= 2 (“=”)
Comparison ref. value=166


COUNT_ENABLE
WRITE_HSCC_WR
REQ DONE
BASE STAT
SLOT
CH
COUNT_ENABLE
PRESET_ENABLE
DOWN_SEL
AUX_ENABLE
CV_BW_RESET
PRE_IE
AUX_IE
PRE_RESET
READ_HSCC_RD
DOWN_FLAG
EXT_PRESET
CARRY
BORROW
AUX_RUN
COUNT_HSCC_CNT
CURRENT_COUNT
COUNT_LATCH
SAMPLING_CNT
CMP_ENABLE
FREQ_COUNT
CMP_OUT_ENABLE
RPM
IN_FREQ
RPU
CMP_OUT_HSCC_OUT
CMP0_OUT
CMP_OUTPUT0
CMP1_OUT
CMP_OUTPUT1
EQUAL0_RESET
EQUAL1_RESET
STOP_SEL
DINT_TO_BCD
%QD0.1.0
PROCESS_COMPLETE
%IX0.0.0
%QX0.3.1
%QX0.3.0



* After six times repetition of drill work, process completion signal is On.

Chapter 6 Internal Memory and I/O Signal

6.1 Internal Memory

■ The high speed counter module has the internal memory for data writing/reading to/from the PLC CPU. The PUT and PUTP command write data from the PLC CPU to the internal memory of high speed counter module. The GET and GETP command read data from the internal memory of high speed counter module. (Please refer to the manuals relating to the instructions.)

6.1.1 The configuration of internal memory

1) Input data area

CH0	CH1	Description
0000	0032	Pulse input mode selection
0001	0033	Linear / Ring count selection
0002	0034	Supplementary function selection
0003	0035	OUT0 coincidence output selection
0004	0036	OUT1 coincidence output selection
0005	0037	NA
0006	0038	Frequency unit input frequency count
0007	0039	Setting the Preset value
0008	0040	
0009	0041	Setting the user-defined maximum value for ring count
0010	0042	
0011	0043	Setting the user-defined minimum value for ring count
0012	0044	
0013	0045	Setting preset time for Sampling count or Setting preset time for rotation count per unit time
0014	0046	Pulse number per 1 rotation of rotation count unit time
0015	0047	Comparison reference value of OUT0 coincidence output for single comparison (selection 0,1,2,3,4) or User-defined minimum value of OUT0 coincidence output for section comparison (selection 5, 6)
0016	0048	
0017	0049	User-defined maximum value OUT0 coincidence output for section comparison (selection 5, 6)
0018	0050	
0019	0051	Comparison reference value of OUT1 coincidence output for single comparison (selection 0,1,2,3,4) or User-defined minimum value of OUT1 coincidence output for section comparison (selection 5, 6)
0020	0052	
0021	0053	User-defined maximum value OUT1 coincidence output for section comparison (selection 5, 6)
0022	0054	

2) The range of setting the coincidence output status

CH0	CH1	Description
0060		setting the coincidence output status when the operation of mode of PLC CPU is STOP mode

3) The range of setting the input data

CH0	CH1	Description
0061	0062	Setting the input data (Hexadecimal : h000F, Decimal : 15)

Remark

You have to use the range of setting the input data for transferring the value of the input data area (address 0~22, address 32~54) to high speed counter. Therefore you have to input the value to the range of input data and input the value as “h000F or 15” for transferring them to the range of input data.

4) Output data area

CH0	CH1	Description
0064	0080	Current count value
0065	0081	
0066	0082	Latch count value
0067	0083	
0068	0084	Sampling count value
0069	0085	
0070	0086	Input frequency count
0071	0087	
0072	0088	Rotation count per unit time
0073	0089	

6.1.2 The configuration of detail data

1) Pulse input mode selection (CH0: address 0, CH1: address 32)

Value (decimal)	Description
0	2 phase multiple of 1
1	2 phase multiple of 2
2	2 phase multiple of 4
3	CW / CCW
4	1 phase multiple of 1 (Up/down count by program)
5	1 phase multiple of 2 (Up/down count by program)
6	1 phase multiple of 1 (Up/down count by phase B)
7	1 phase multiple of 2 (Up/down count by phase B)

2) Ring/Linear count selection (CH0: address1,CH1: address 33)

Value(decimal)	Description
0	Linear count
1	Ring count

3) Supplementary function selection (CH0: address 2, CH1: address 34)

Value (decimal)	Description
0	NA
1	Count clear function
2	Count latch function
3	Sampling count function
4	Input frequency count function
5	Rotation count per unit time function
6	Count disable

4) Coincidence output selection (CH0: address 3~4, CH1: address 35~36)

Value (decimal)	Description
0	When current count < User-defined value, OUT0 or OUT1 is turned On.
1	When current count =< User-defined value, OUT0 or OUT1 is turned On.
2	When current count = User-defined value, OUT0 or OUT1 is turned On.
3	When current count >= User-defined value, OUT0 or OUT1 is turned On
4	When current count > User-defined value, OUT0 or OUT1 is turned On
5	When User-defined value1=<Current value =<User-defined value2, OUT0 or OUT1 is turned On.
6	When User-defined value1>= Current value or Current value =< User-defined value2 , OUT0 or OUT1 is turned On.

5) Frequency unit of input frequency count (CH0: address 6, CH1: address 38)

Value (decimal)	Unit [Hz]
0	1
1	10
2	100
3	1,000

6.2 Input/Output Signal

PLC <- High-Speed Counter Module			PLC -> High-Speed Counter Module		
Channel	Signal	Description	Ch	Signal	Description
CH0	P(N)0	Up/down count flag (On: Down count)	0	P(N+2)0	Count enable (Level)
	P(N)1	Detection of external the preset input		P(N+2)1	Preset enable (Edge)
	P(N)2	NA		P(N+2)2	Up/Down count selection (Level)
	P(N)3	Carry		P(N+2)3	Supplementary function enable (Level/Edge)
	P(N)4	Borrow		P(N+2)4	Comparison enable (Level)
	P(N)5	Supplementary function run flag		P(N+2)5	Coincidence output enable (Level)
	P(N)6	OUT0		P(N+2)6	OUT0 coincidence output equal reset (Edge)
	P(N)7	OUT1		P(N+2)7	OUT1 coincidence output equal reset (Edge)
	P(N)8	NA		P(N+2)8	NA
	P(N)9	NA		P(N+2)9	NA
	P(N)A	NA		P(N+2)A	Carry/Borrow reset (Edge)
	P(N)B	NA		P(N+2)B	External preset input selection (Edge)
	P(N)C	NA		P(N+2)C	External supplementary function selection (Edge)
	P(N)D	NA		P(N+2)D	External preset detection reset (Edge)
	P(N)E	NA		P(N+2)E	NA
	P(N)F	NA		P(N+2)F	NA
CH1	P(N+1)0	Up/down count flag (On: Down count)	1	P(N+3)0	Count enable (Level)
	P(N+1)1	Detection of external the preset input		P(N+3)1	Preset enable (Edge)
	P(N+1)2	NA		P(N+3)2	Up/Down count selection (Level)
	P(N+1)3	Carry		P(N+3)3	Supplementary function enable (Level/Edge)
	P(N+1)4	Borrow		P(N+3)4	Comparison enable (Level)
	P(N+1)5	Supplementary function run flag		P(N+3)5	Coincidence output enable (Level)
	P(N+1)6	OUT0		P(N+3)6	OUT0 coincidence output equal reset (Edge)
	P(N+1)7	OUT1		P(N+3)7	OUT1 coincidence output equal reset (Edge)
	P(N+1)8	NA		P(N+3)8	NA
	P(N+1)9	NA		P(N+3)9	NA
	P(N+1)A	NA		P(N+3)A	Carry/Borrow reset (Edge)
	P(N+1)B	NA		P(N+3)B	External preset input selection (Edge)
	P(N+1)C	NA		P(N+3)C	External supplementary function selection (Edge)
	P(N+1)D	NA		P(N+3)D	External preset detection reset (Edge)
	P(N+1)E	NA		P(N+3)E	NA
	P(N+1)F	NA		P(N+3)F	NA

※'N' is the I/O word starting number of the High Speed Counter module.

Remark

It is 64 points to I/O occupied points of G4F-HD1C, G4F-HO1C,G6F-HD1C and G6F-HO1C.

Chapter 7 MK Programming

7.1 Reading/Writing the Internal Memory

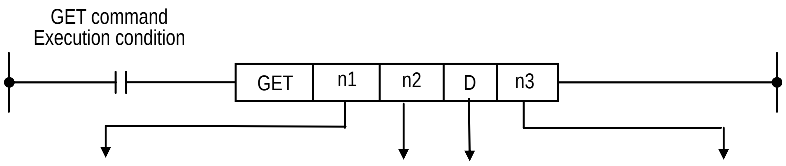
7.1.1 Reading the internal memory

■ The commands given below are used to read data from the buffer memory of the high speed counter module to the CPU. The data read can be stored to the CPU memory (F area is not excluded.).

1) GET/GETP

Always execution during the execution condition On.	GET
Execution when the execution condition rises.	GETP

2) GET/GETP command configuration



Content	The slot number which the special module is mounted.	Starting address of the internal memory which the data is stored	Starting word number of the CPU memory area which the read data is stored.	Data word number for reading
Usable memory area	Integer	Integer	M, P, K, L, T, C, D, #D	Integer

3) n1 setting method

Main base

Power	CPU	slot 0	slot 1	slot 2	slot 3	slot 4	slot 5	slot 6	slot 7
	(n_1)	0	1	2	3	4	5	6	7

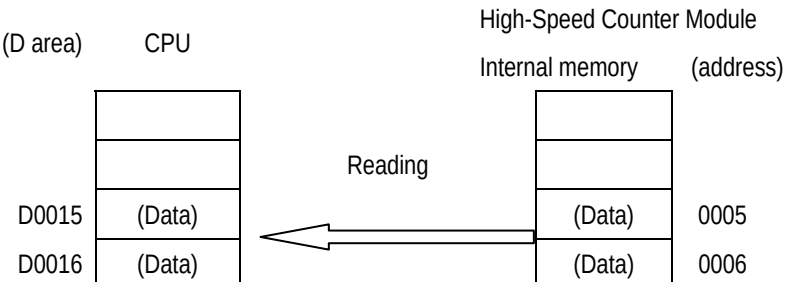
Expansion base

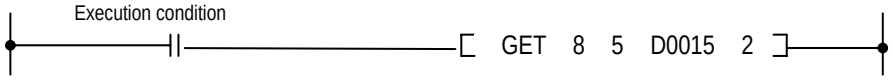
Power	slot 0	slot 1	slot 2	slot 3	slot 4	slot 5	slot 6	slot 7
	8	9	10	11	12	13	14	15

4) GET/GETP using example

Example1

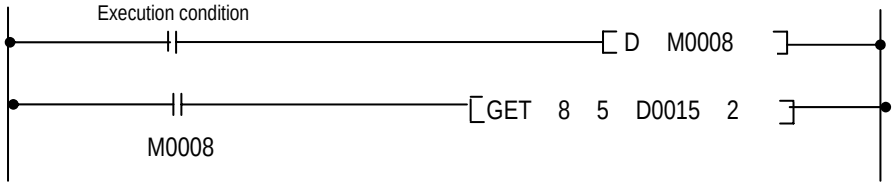
In case, the high speed counter module is mounted on the first expansion base and CPU reads buffer memory address 0005 and stores two words in the D0015 and D0016.





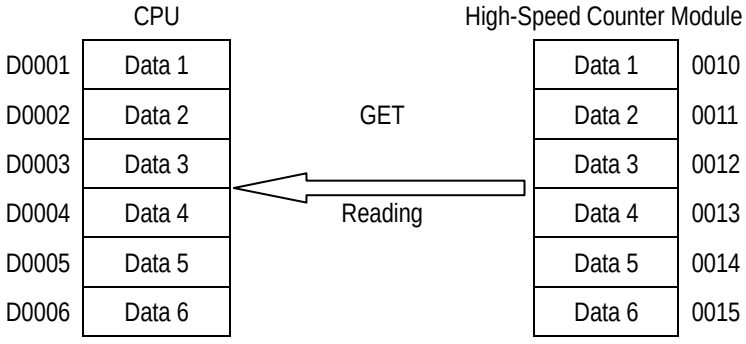
Example2

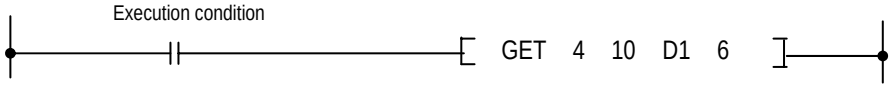
In this case ,the same data area of the example 1 is read only at the execution condition's rising.



Example3

In case, High-Speed Counter Module is mounted in the slot 4 (main base) and CPU reads 6words from internal memory 0010, stores the data to D0001~D0006.



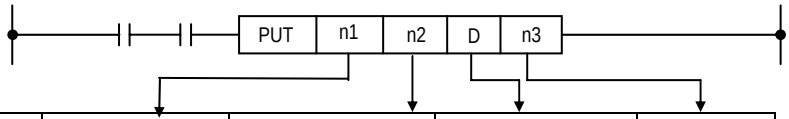


7.1.2 Writing the internal memory

1) PUT/PUTP

Always execution during the execution condition On.	PUT
Execution when the execution condition rises.	PUTP

2) PUT/PUTP command configuration



Content	The slot number which the special module is mounted.	Starting address of the internal memory which the data is stored	Starting word number of the CPU memory area which the write data is stored.	Data word number for writing
Usable memory area	Integer	Integer	M, P, K, L, T, C, D, #D	Integer

3) n1 setting method

Main base

Power	CPU	slot 0	slot 1	slot 2	slot 3	slot 4	slot 5	slot 6	slot 7
(n_1)		0	1	2	3	4	5	6	7

Expansion base

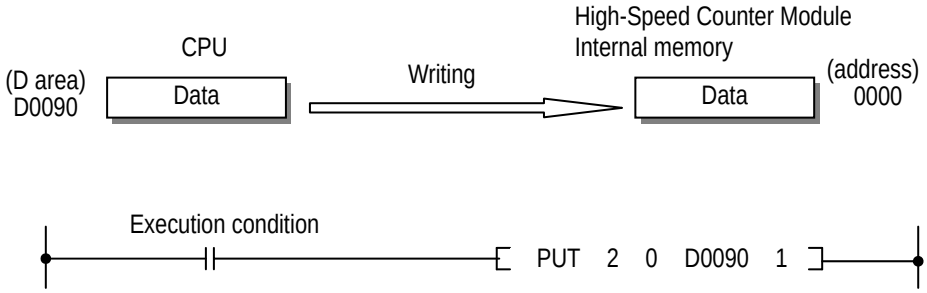
Power	slot 0	slot 1	slot 2	slot 3	slot 4	slot 5	slot 6	slot 7
	8	9	10	11	12	13	14	15

4) PUT/PUTP using example

Example1

● 16 bit data writing

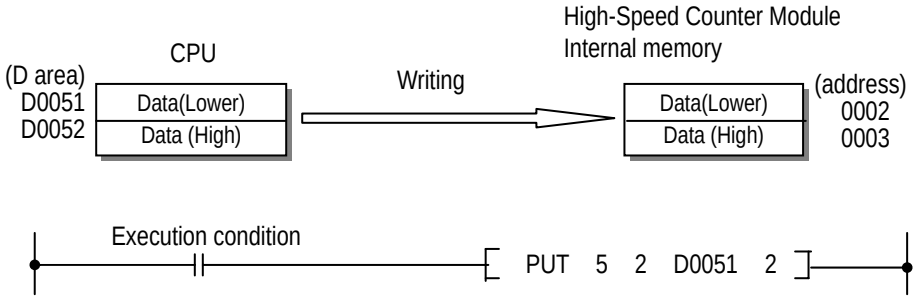
In case, the high speed counter module is mounted on the first expansion base's slot 2 and CPU writes the data of D0090 to buffer memory address 0000.



Example2

● 32-bit data writing

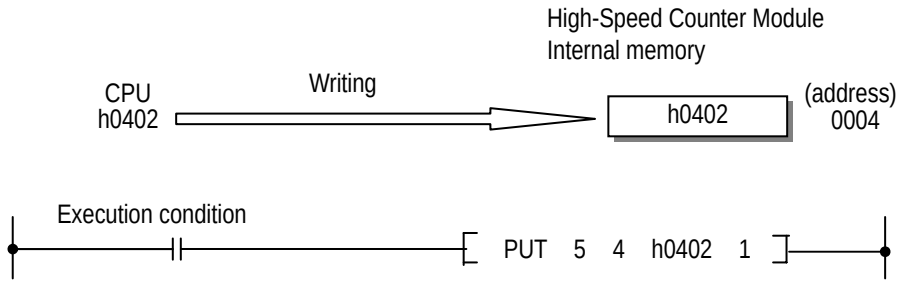
In case, the high speed counter module is mounted on the first expansion base's slot 5 and CPU writes the data of D0051/ D0052 to buffer memory address 0002/0003.



Example3

● Integer writing

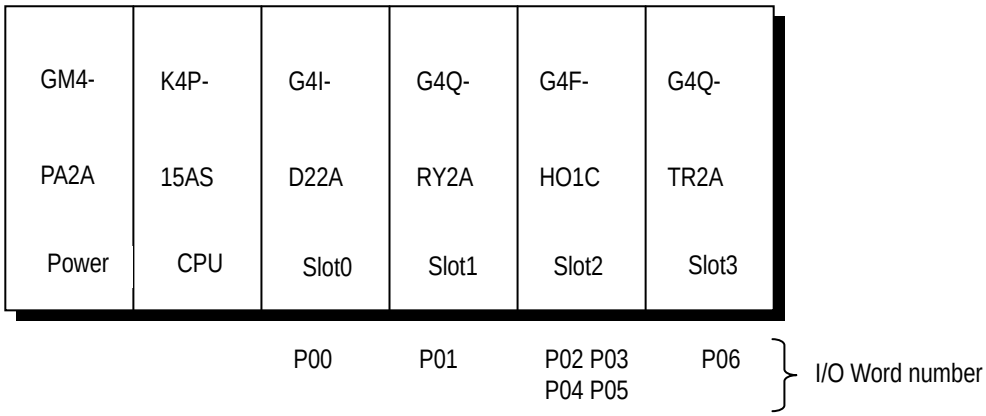
In case, , the high speed counter module is mounted on the main base's slot 5 and writes h0401 to buffer memory address4



7.2 Programming Example

■ If not especially mentioned, this section explains programming examples in reference with G4F-HO1C that is mounted on the system as below.

■ System configuration

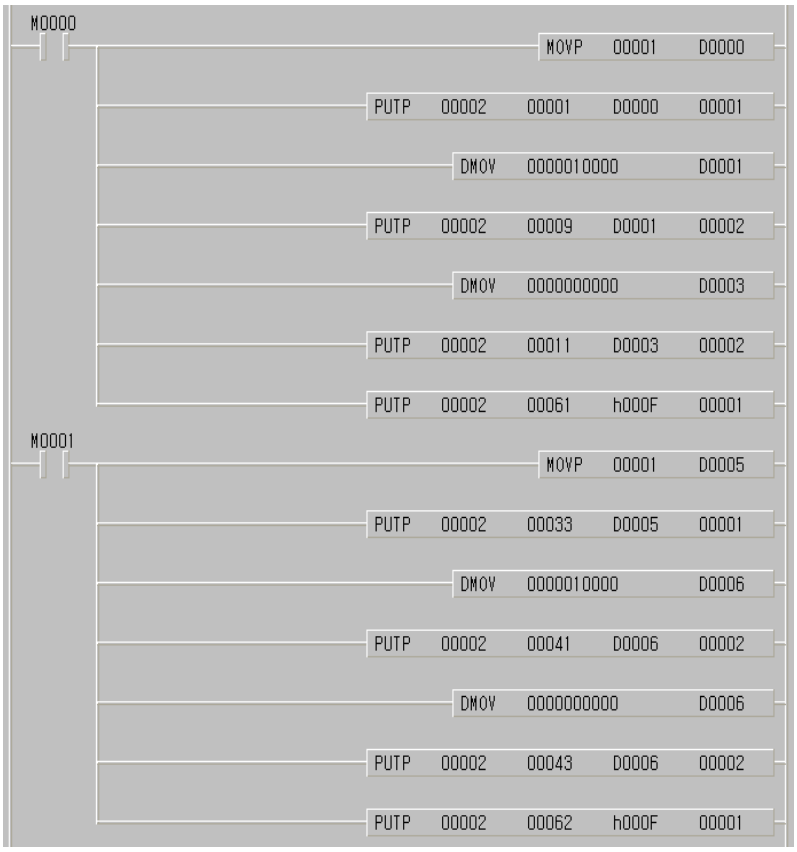


7.2.1 Count mode selection

■ The following is a program example how to set the count mode. (0 : Linear count mode, 1:Ring count mode)

If count mode is not selected, High-Speed counter Module is executed as Linear count mode.

[Program]



Ch 0
For selecting ring count mode,
1 is written to address 1.

Ch 0
For setting count maximum value,
10000 is written to address 9.

Ch 0
For setting count minimum value,
0 is written to address 11.

Ch 0
Setting the Input Data (h000F)

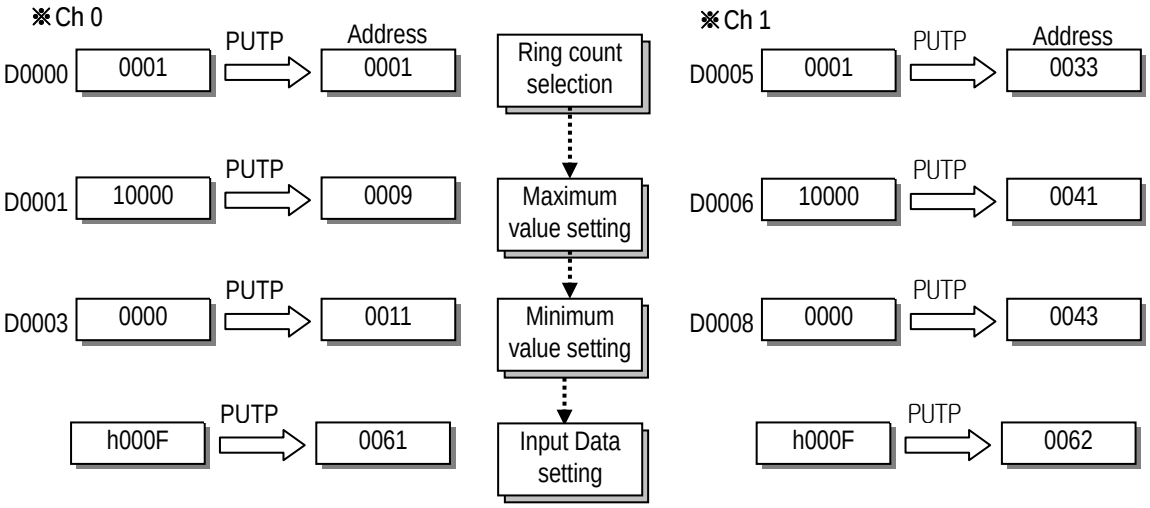
Ch 1
For selecting ring count mode,
1 is written to address 33.

Ch 1
For setting count maximum value,
10000 is written to address 41.

Ch 1
For setting count maximum value,
0 is written to address 43.

Ch 1
Setting the Input Data (h000F)

,

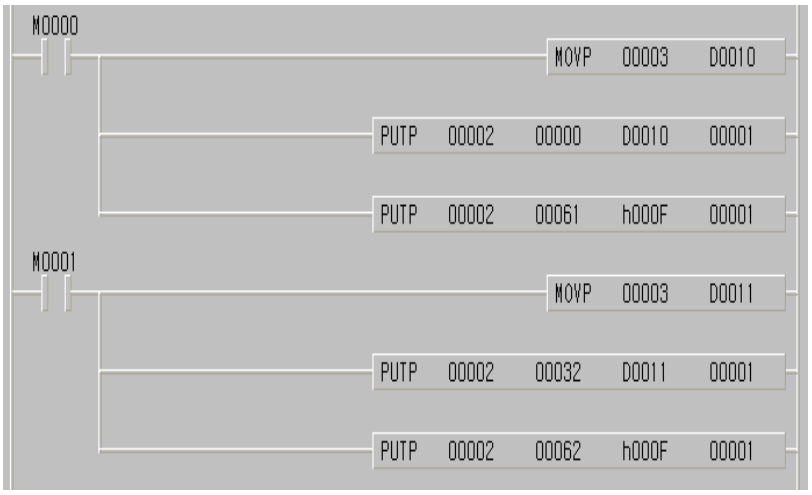


7.2.2 Pulse input mode setting

■ The following is a program example how to set the pulse input mode (0: 2 phase multiple of 1, 1: 2 phase multiple of 2, 2: 2 phase multiple of 4, 3: CW/CCW, 4: 1 phase multiple of 1 (up/down count by program), 5: 1 phase multiple of 2 (up/down count by program), 6: 1 phase multiple of 1 (up/down count by phase B), 7: 1 phase multiple of 2 (up/down count by phase B).

If the pulse input mode is not selected, High-Speed counter Module is executed as 2 phase multiple of 1.

[Program]



Ch 0
For selecting CW/CCW mode, 3 is written to address 0.

Ch 0
Setting the Input Data (h000F)

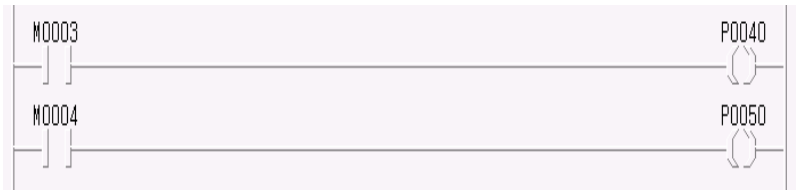
Ch 1
For selecting CW/CCW mode, 3 is written to address 32.

Ch 1
Setting the Input Data (h000F)

7.2.3 Count enable

■ This program is about how to set the count enable.

[Program]

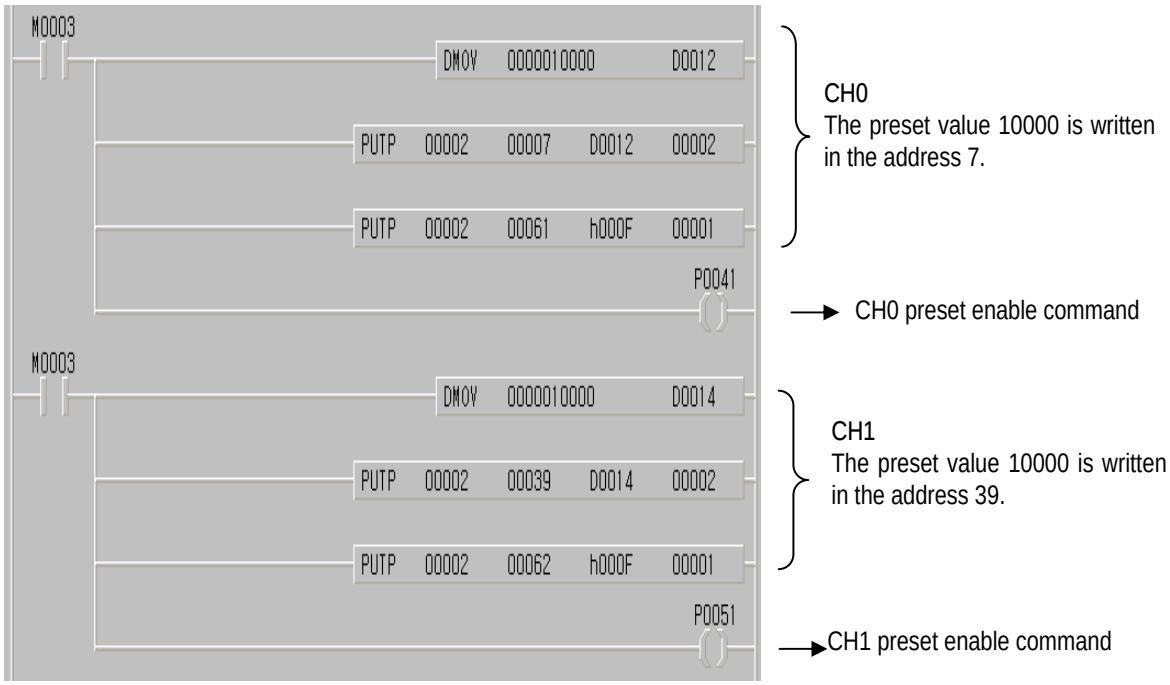


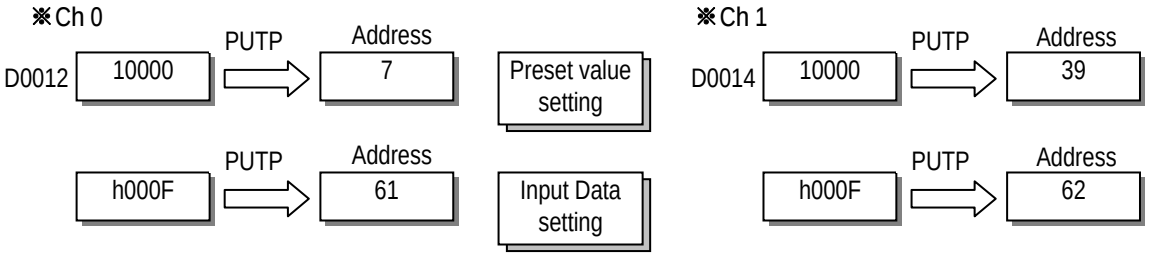
→ CH0 count enable command

→ CH1 count enable command

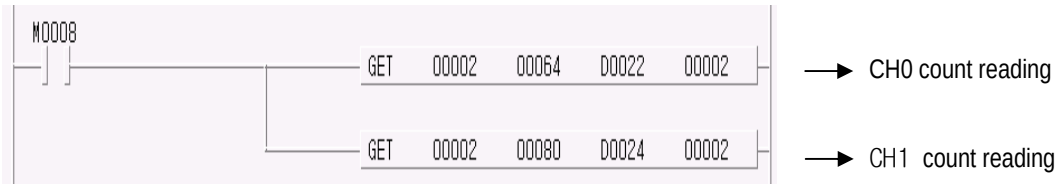
7.2.4 Setting the Preset value and Preset enable (by program)

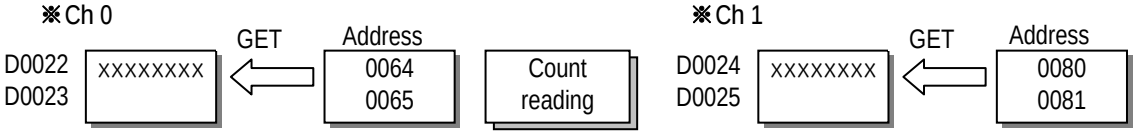
■ The following is a program example writing the preset value 10000 to the internal memory.





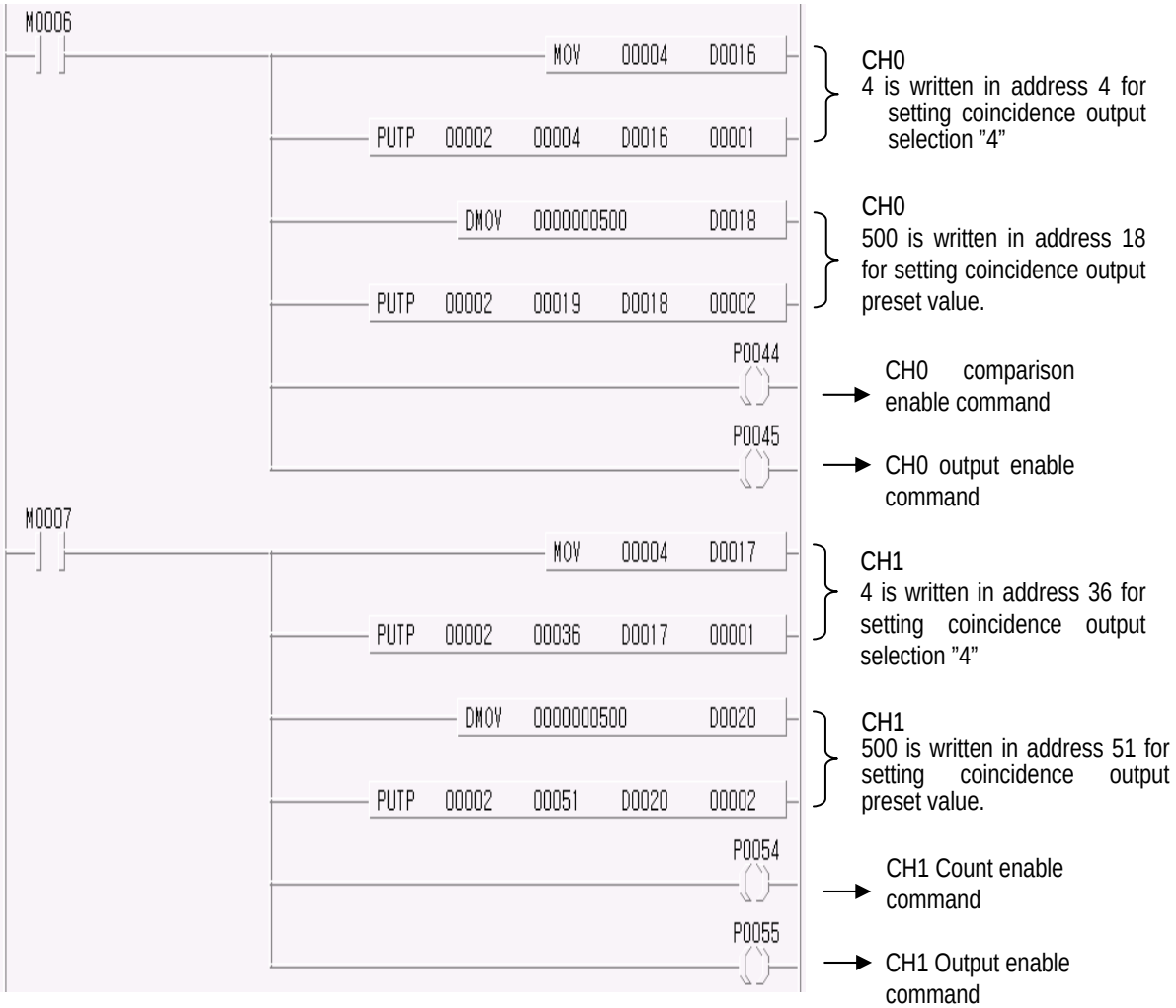
7.2.5 Reading the current value

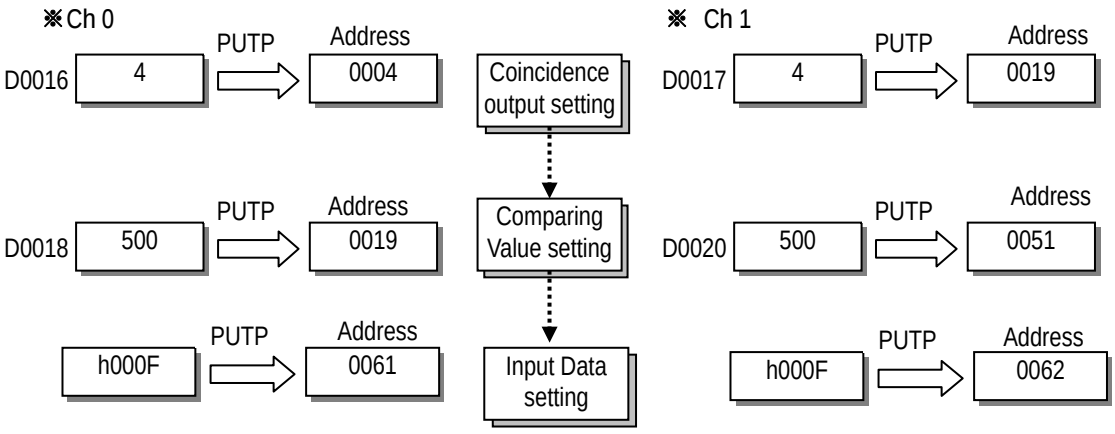




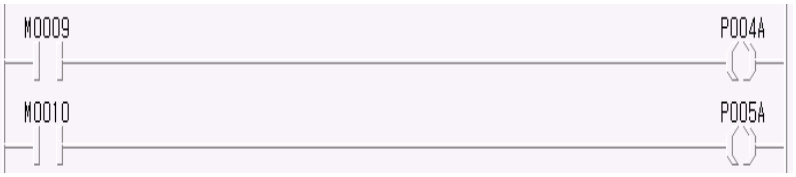
7.2.6 Coincidence output selection and setting

■ The following is a program example selecting the coincidence output mode 4 and writing user-defined value 500 to the internal memory.



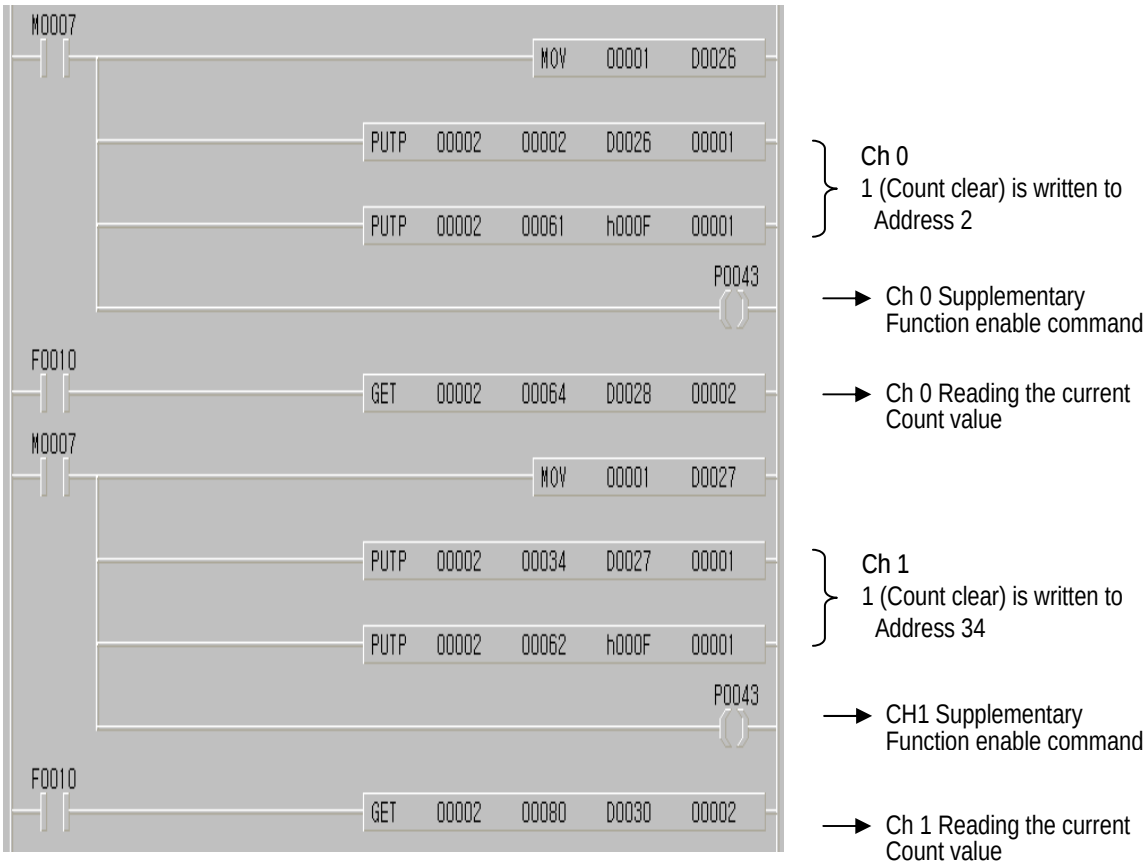


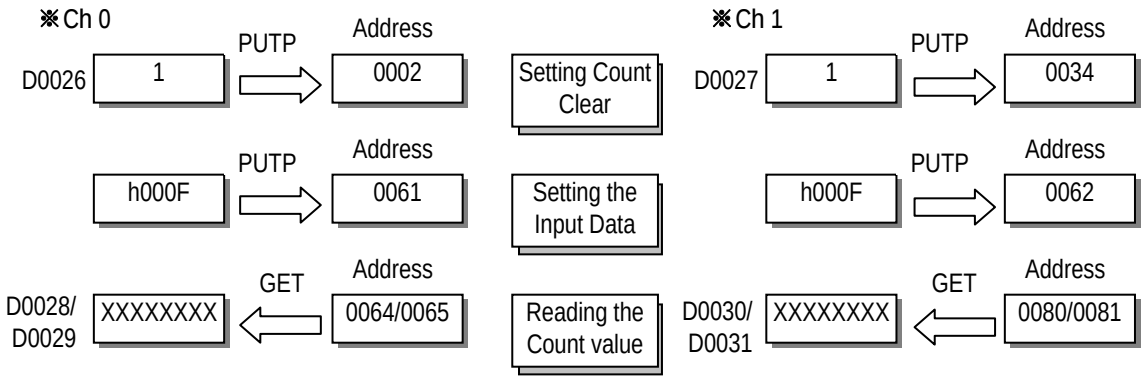
7.2.7 Carry/Borrow reset



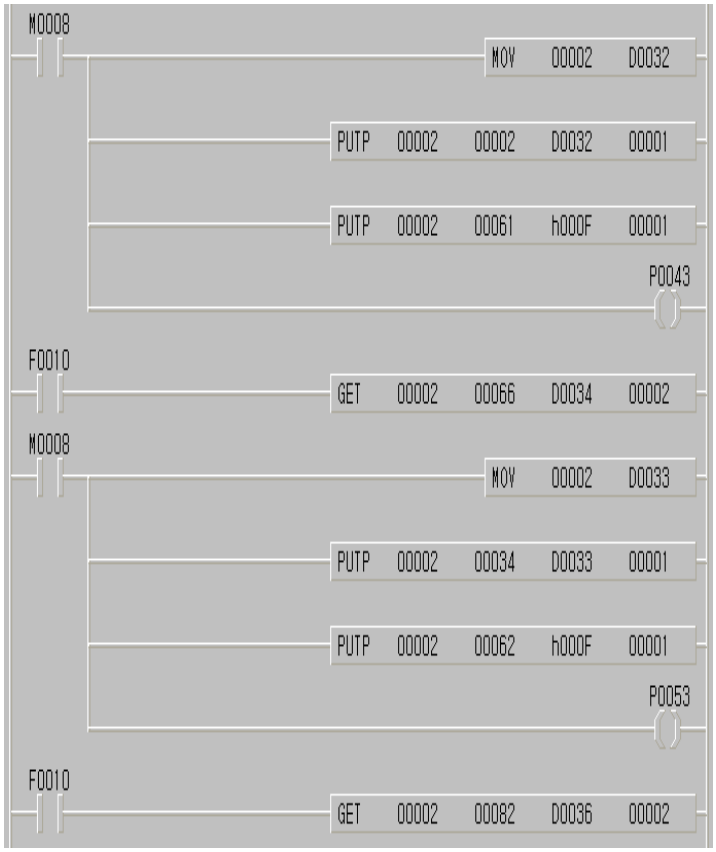
7.2.8 Supplementary functions

1) Count clear





2) Count latch



Ch 0
2 (Count latch) is written to address 2

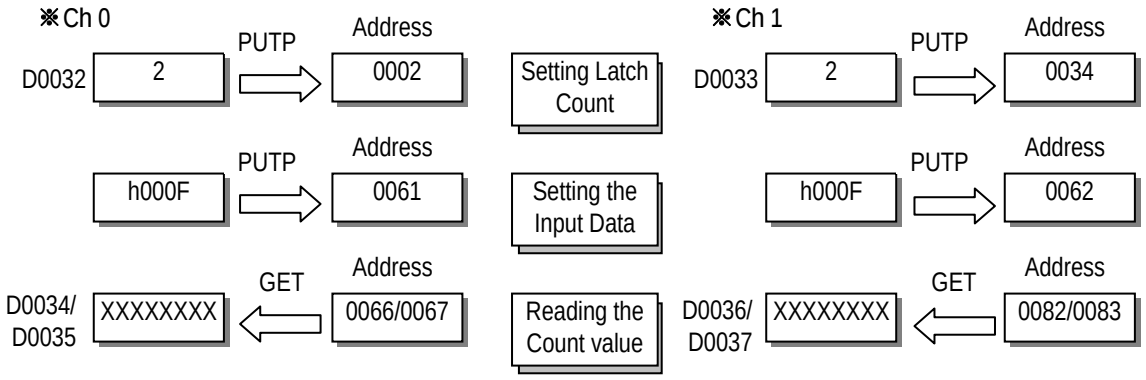
→ Ch 0 Supplementary enable command

→ Count latch value is read from address 66.

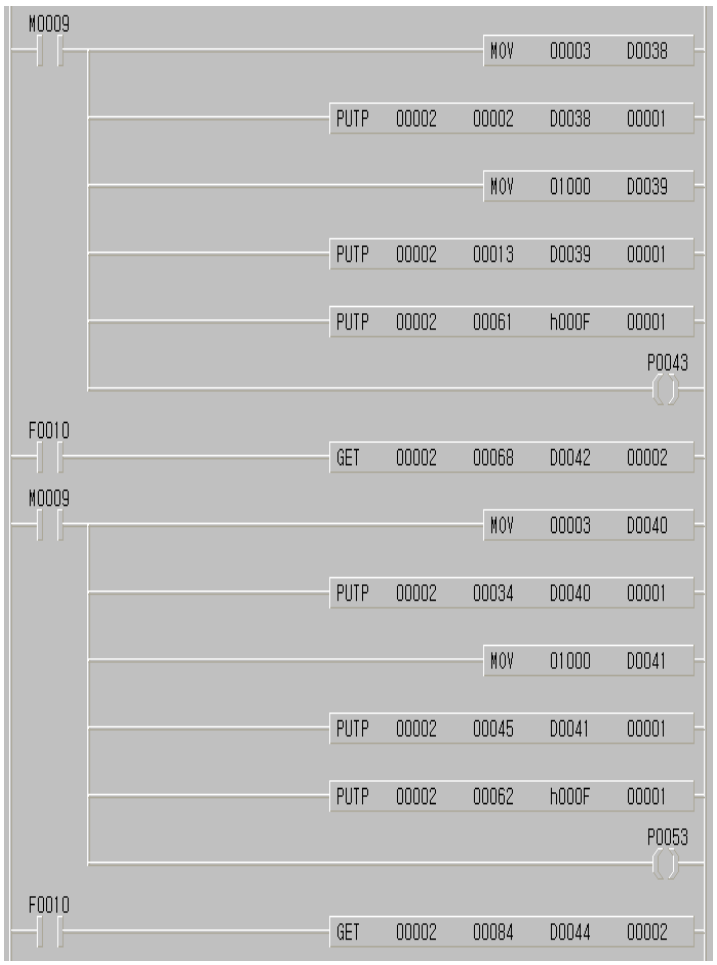
Ch 1
2 (Count latch) is written to address 34

→ Ch 1 Supplementary enable command

→ Count latch value is read from address 82.



3) Sampling count



Ch 0
3 (Sampling count) is written to address 2.
1000 (ms) is written to address13.
Setting the input data (h000F)

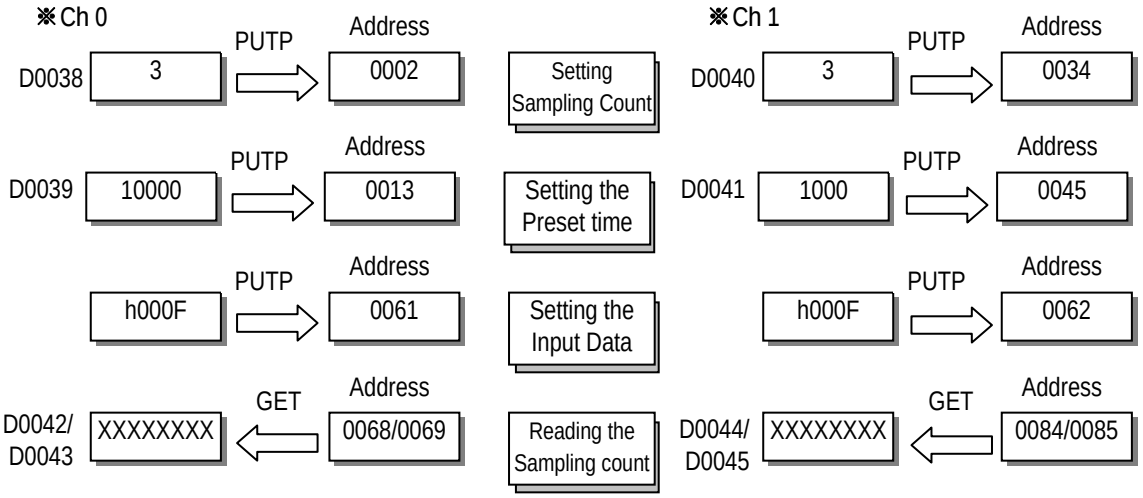
→ Ch 0 Supplementary function enable command

→ Ch 0 Sampling count value is read from address 68.

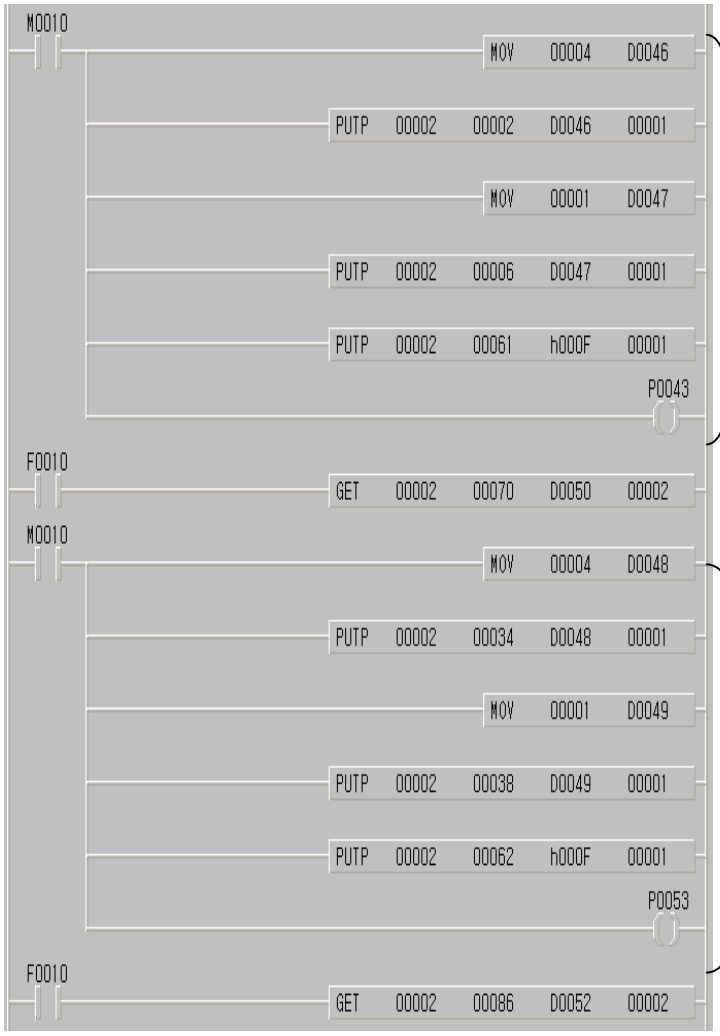
Ch 1
3 (Sampling count) is written to address 34.
1000 (ms) is written to address45.
Setting the input data (h000F)

→ Ch 1 Supplementary function enable command

→ Ch 1 Sampling count value is read from address 84.



4) Input frequency count

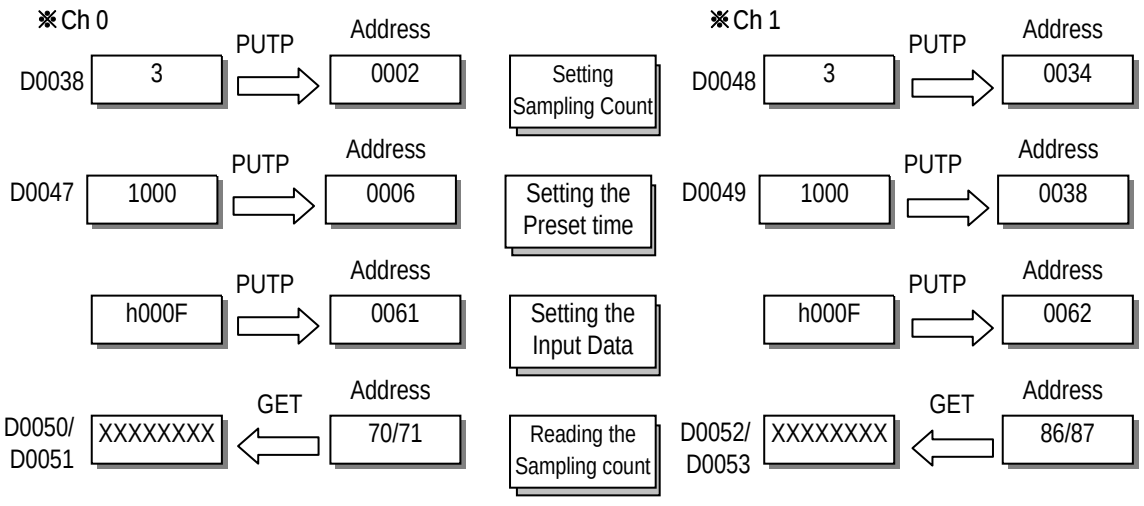


CH0
1. 4 (Pulse frequency count) is written to address 2.
2. 1 (10Hz) is written to address6.
3. Setting the input data (h000F)
4. Supplementary function enable command is On

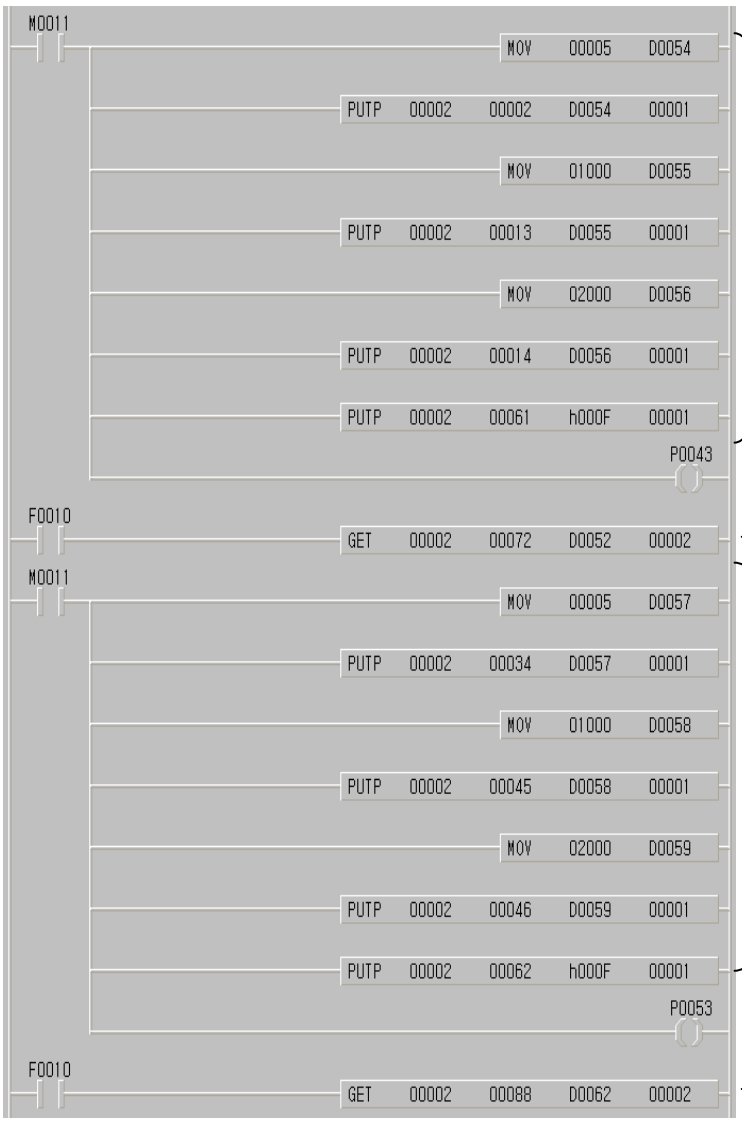
→ Ch 0 Input frequency count is read from address 70.

CH1
1. 4 (Pulse frequency count) is written to address34.
2. 1 (10Hz) is written to address38.
3. Setting the input data (h000F)
4. Supplementary function enable command is On

→ Ch 1 Input frequency count is read from address 86.



5) Rotation count per unit time

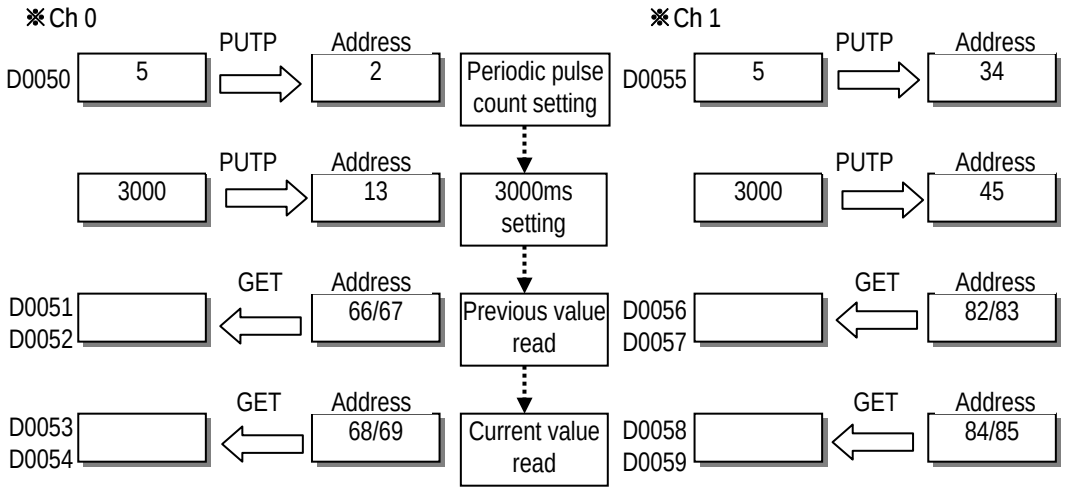


CH0
1.5(rotation count per time unit) is written to address 2
2.1000(ms) is written to address13.
3.1000(pulse) is written to address14.
4. Setting the Input Data(h000F)
5. Supplementary function enable command is On

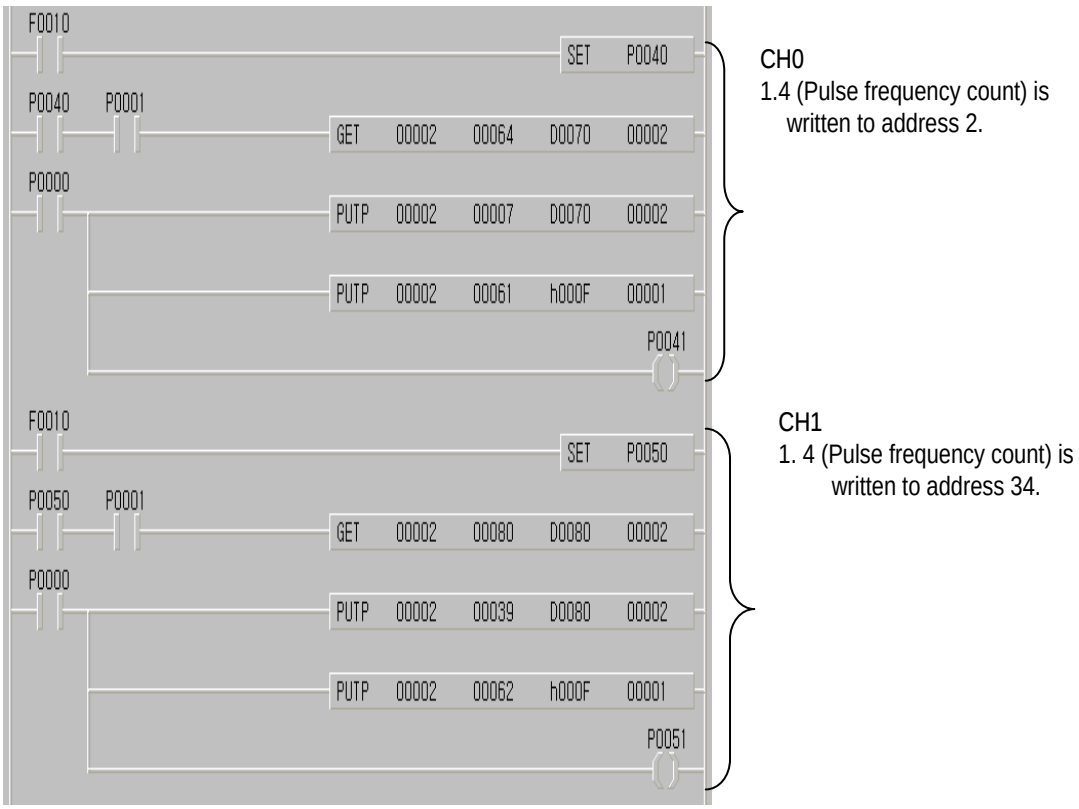
Ch 0 rotation count per unit time is read from address 72.

CH1
1. 5(rotation count per time unit) is written to address 34.
2. 1000(ms) is written to address45

Ch 1 rotation count per unit time is read from address 88.

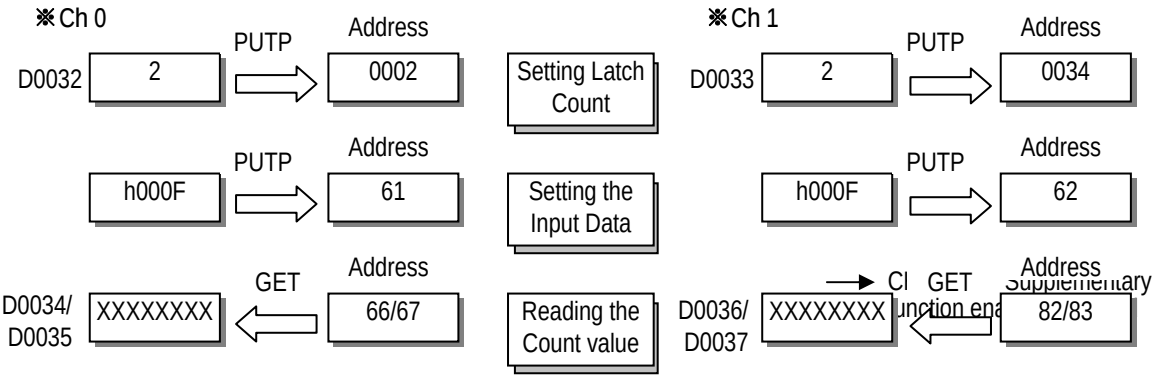


7.2.9 Keeping the current count value when Power is Off



CH0
1.4 (Pulse frequency count) is written to address 2.

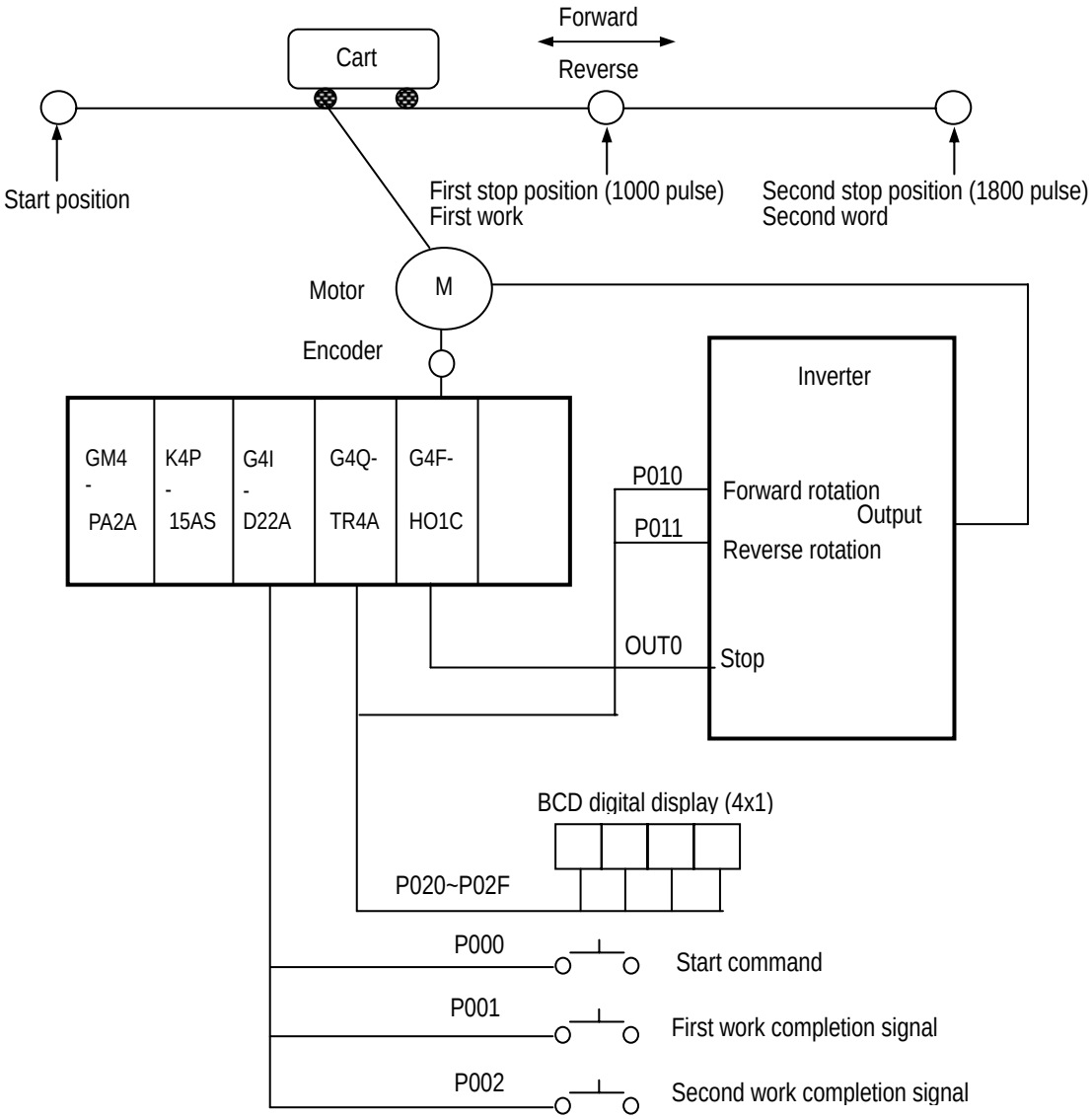
CH1
1. 4 (Pulse frequency count) is written to address 34.



7.3 Application Example

7.3.1 Cart moving program

■ System configuration



■ Operation explanation

The motor for moving the cart rotates with start command, and makes the cart stop at the first stop position with the High Speed Counter Module counting the encoder signals from the motor.

Then, if the first work complete signal turns On, the motor moves the cart to stop at the second stop position. When the second work complete signal turns On, the motor return the cart to the start position.

■ Input/Output Signal Allocation

P000 : Start Command
P001 : 1'st Work Completion Signal } Input
P002 : 2'nd Work Completion Signal

P010 : Motor forward rotation signal (On : Forward rotation , Off : Stop)
P011 : Motor reverse rotation signal (On : Reverse rotation, Off : Stop) } Output
P020~P02F : Indicates the current count value(BCD) of the High Speed Counter Module

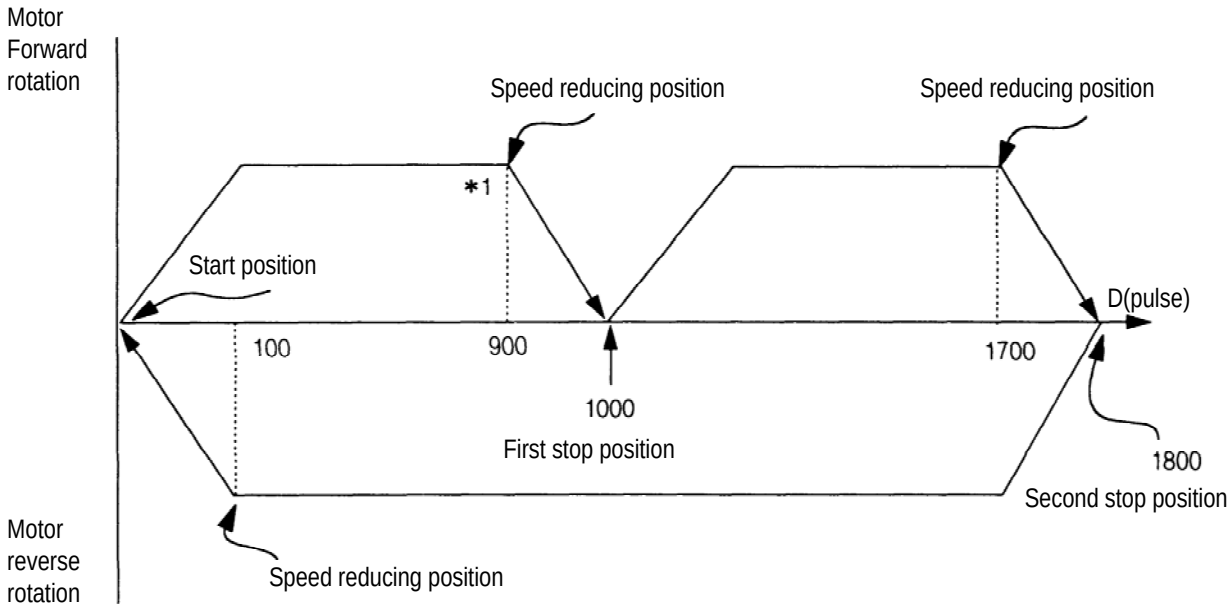
P030~P04F : Input Signal of High-speed counter
P050~P06F : Output Signal of High-speed counter

■ D Register Allocation

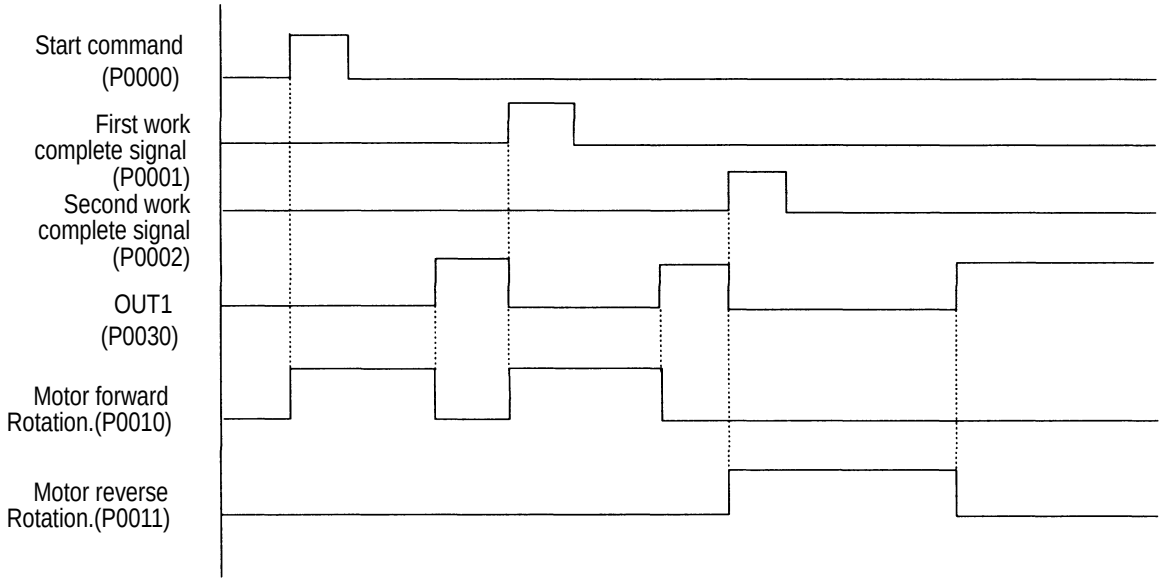
D0000~D0001 : Current count Value of High-speed counter

■ Operation pattern

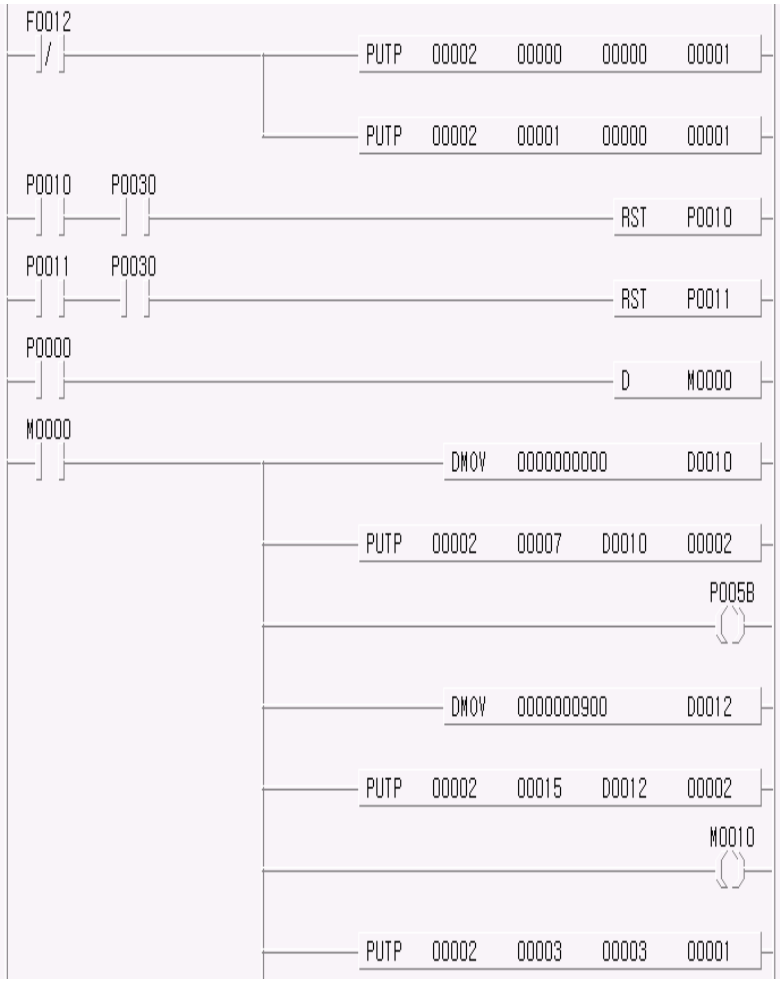
*1. 100(Difference between stop position and speed reducing position) is an interval delayed by reducing timing of the inverter.



■ Operation timing Diagram



■ Program



2Phase multiple of 2 setting

Linear count setting

After passing the speed reducing position, the forwardly rotating motor stops

After passing the speed reducing position, the reversely rotating motor stops

Start

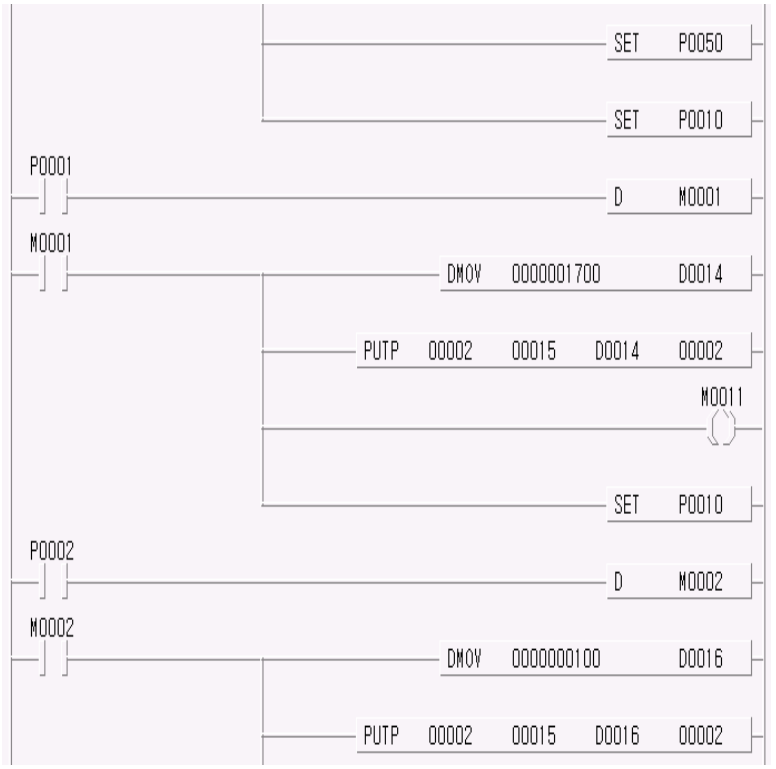
Start position initial value=0
(Preset setting)

External preset input enable

Comparing value for stopping the first work=900

SET signal auxiliary output

OUT0 : " > "



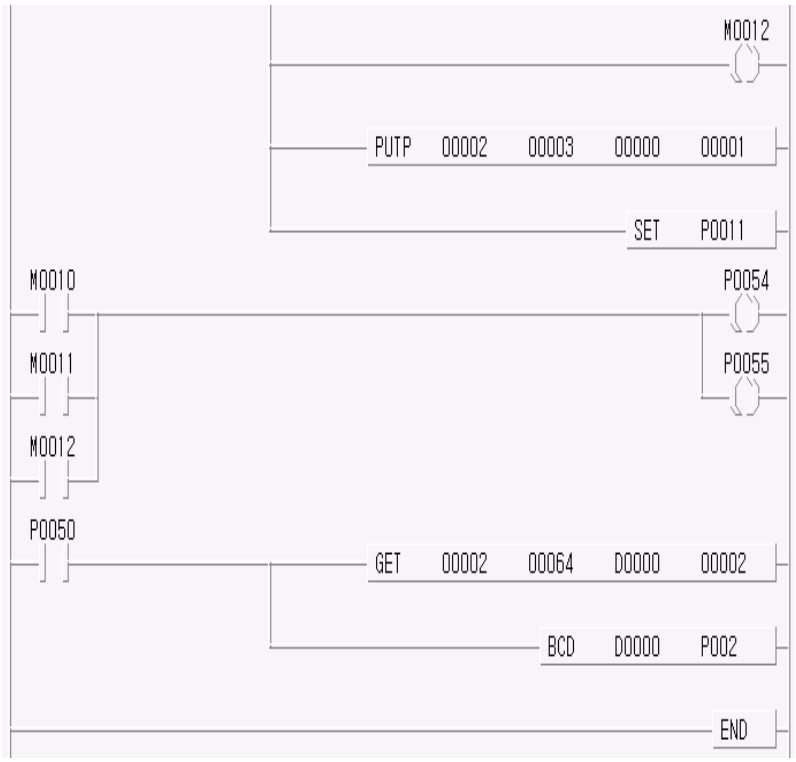
Count enable signal

The signal for motor's forward rotation

Comparing value for stopping the first work=1700

SET signal auxiliary output

Comparing value for stopping the start position=100



SET signal auxiliary output

OUT0 : " < "

The signal for motor's forward rotation

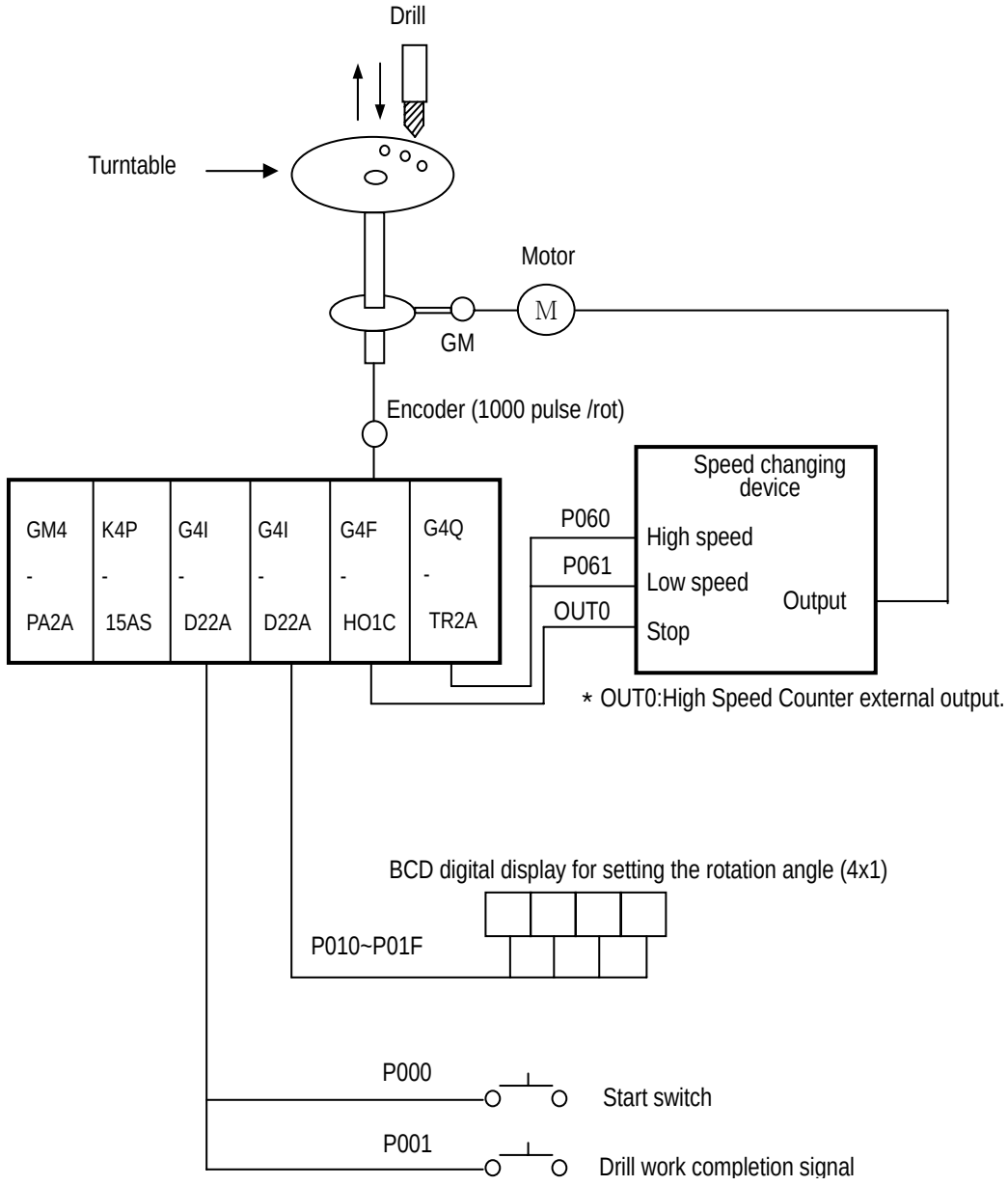
Comparing enable command

Current count value read

Current count BCD display

7.3.2 Program for Control of the Constant Angle rotation of the Turntable.

■ System configuration



K4P-15AS : MK300S CPU

G4I-D22A : DC input module (16 points)

G4F-HO1C : High speed counter module (64 points)

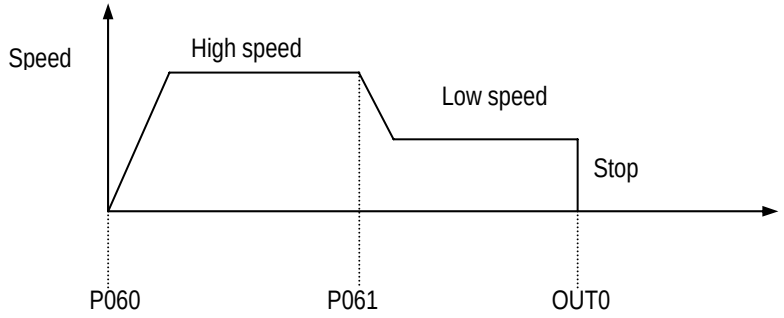
G4Q-TR2A : Tr. output module (16 points)

■ Operation Description

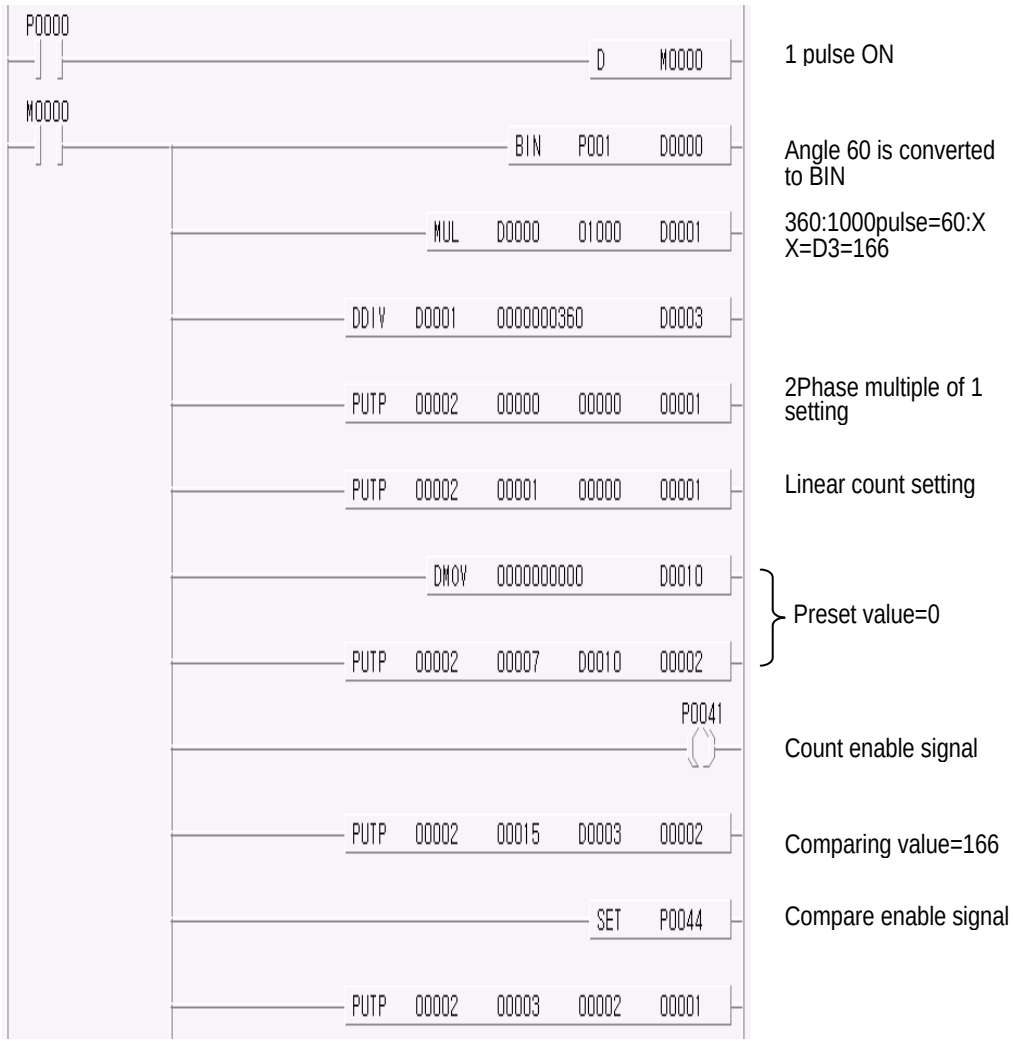
If the start switch is pushed, the turntable rotates as much as the rotation angle set (60˚) and completes drilling.

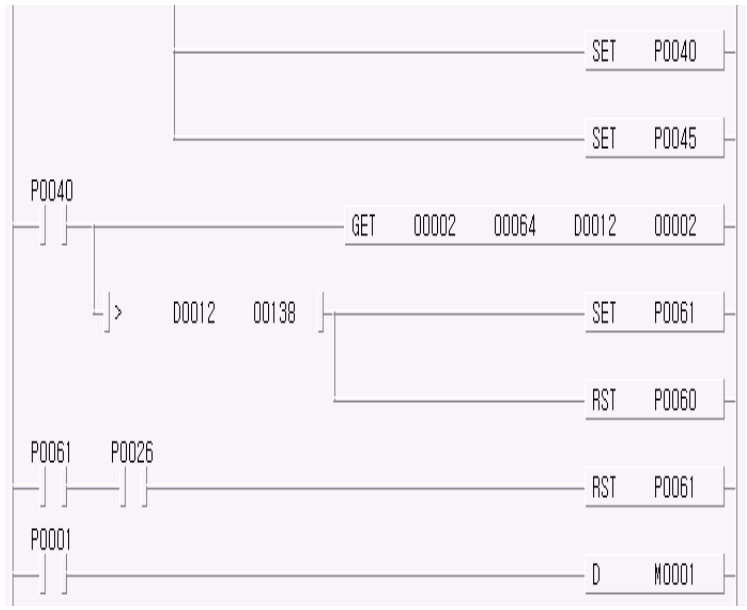
If the drilling work completion signal turns On, it rotates again 60˚. If repeating the above operations has finished six drilling works, all processing will be finished.

■ Operation Format

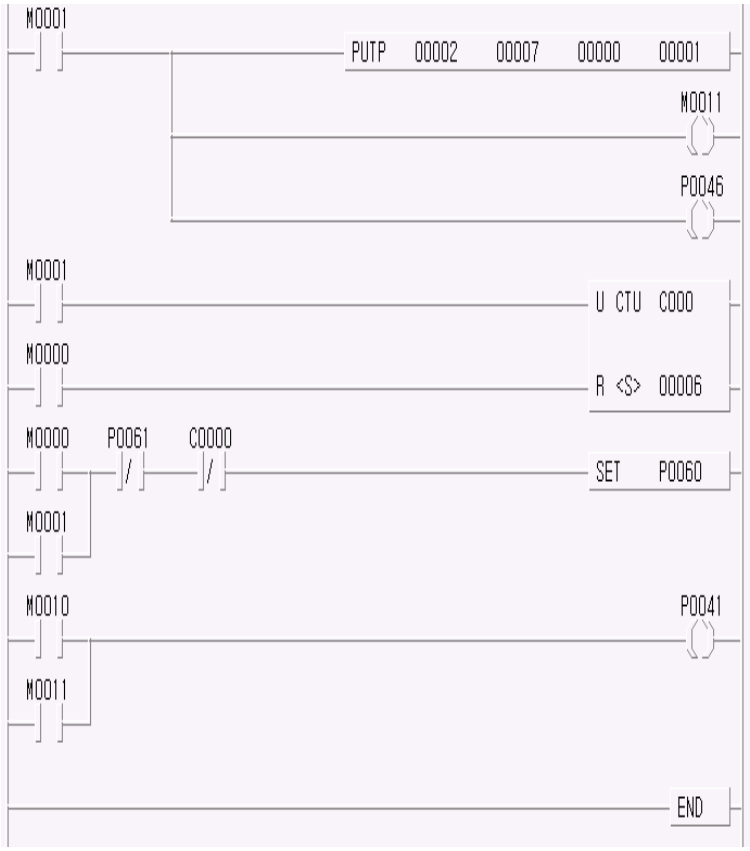


■ Program





Count value is transferred to D0010,D0012

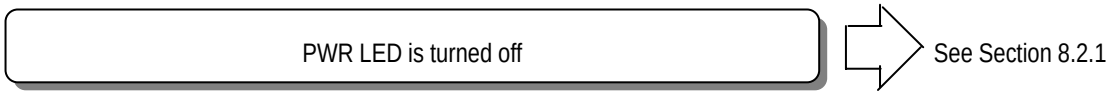


Chapter 8 Troubleshooting

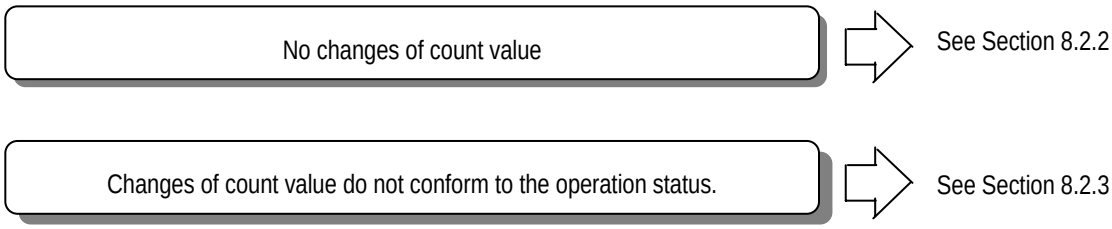
▷ The following explains troubles and corrections when using the High Speed Count Module.
For troubleshooting relating to the CPU module, refer to the CPU module user's manual.

8.1 Troubleshooting

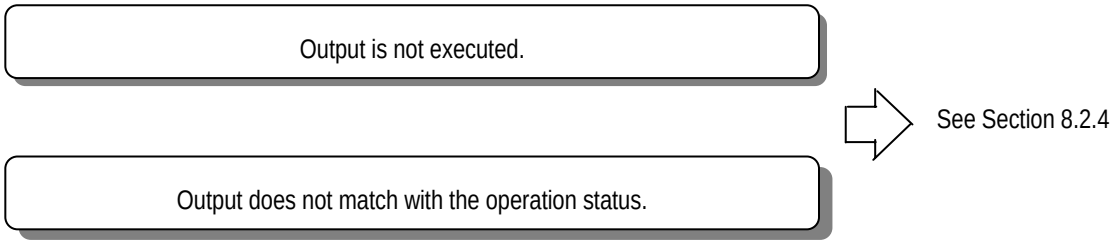
8.1.1 The LED status of High Speed Counter Module



8.1.2 The counting status of High Speed Counter Module

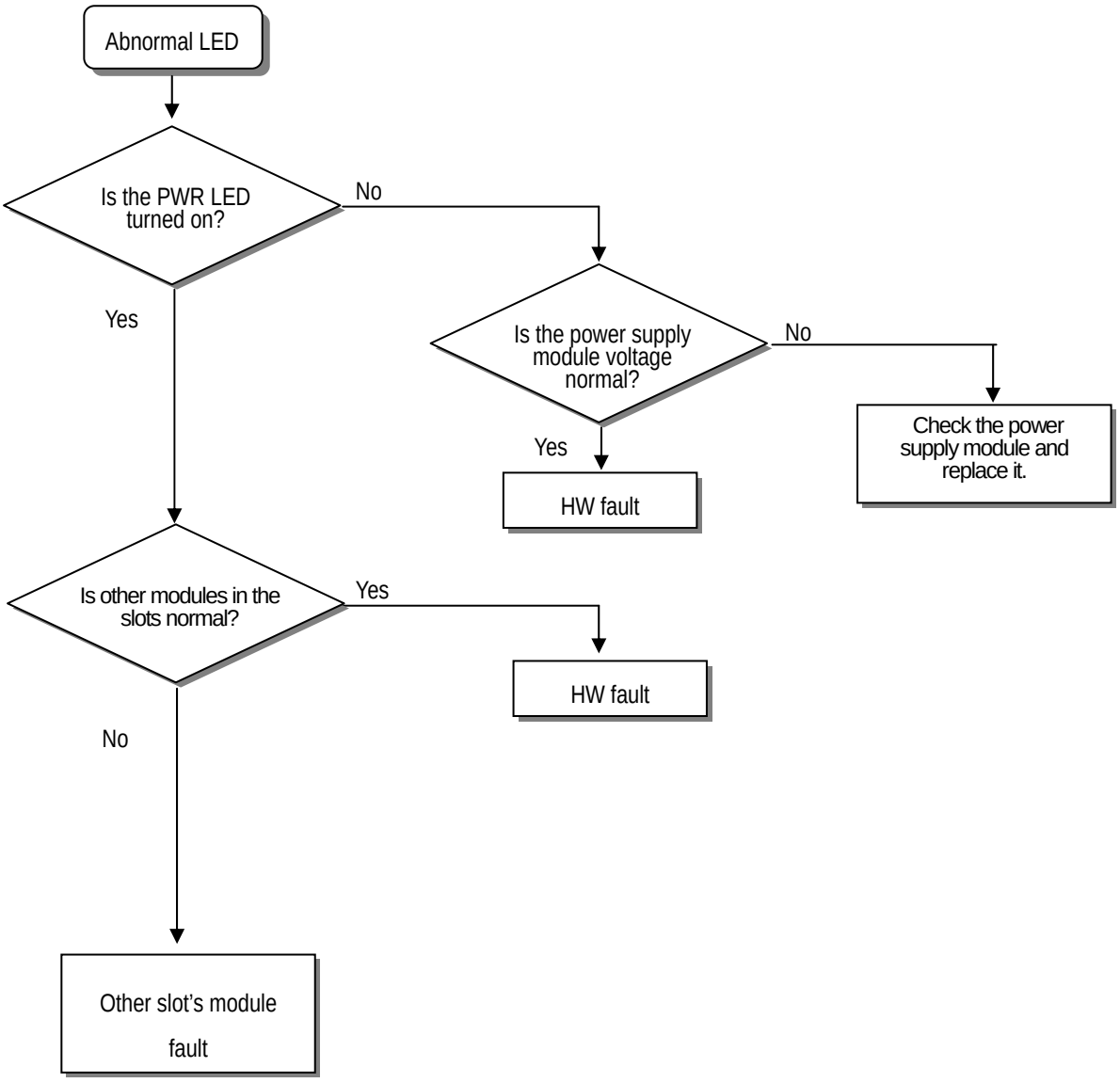


8.1.3 The output status of High Speed Counter Module

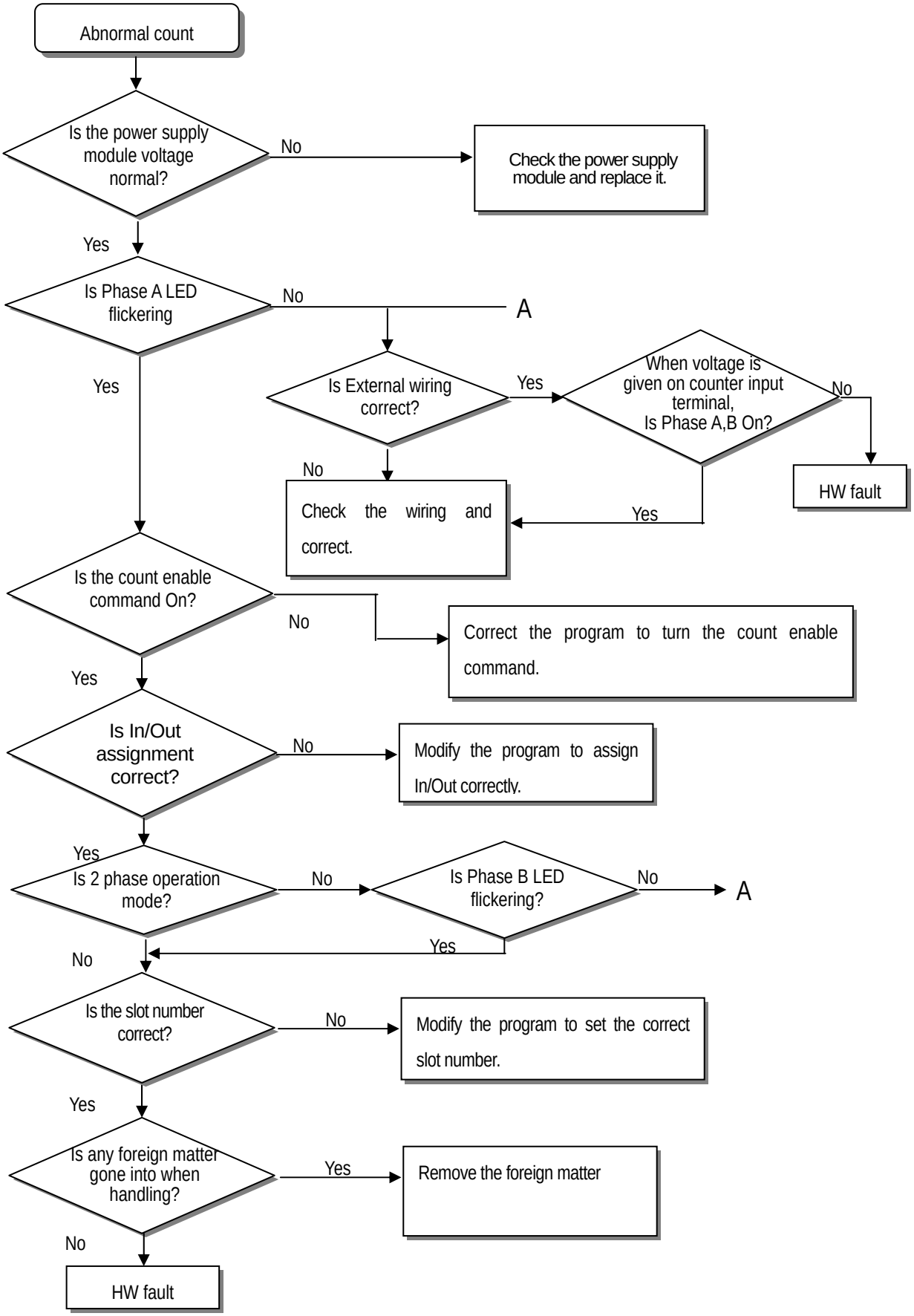


8.2 Troubleshooting Procedure

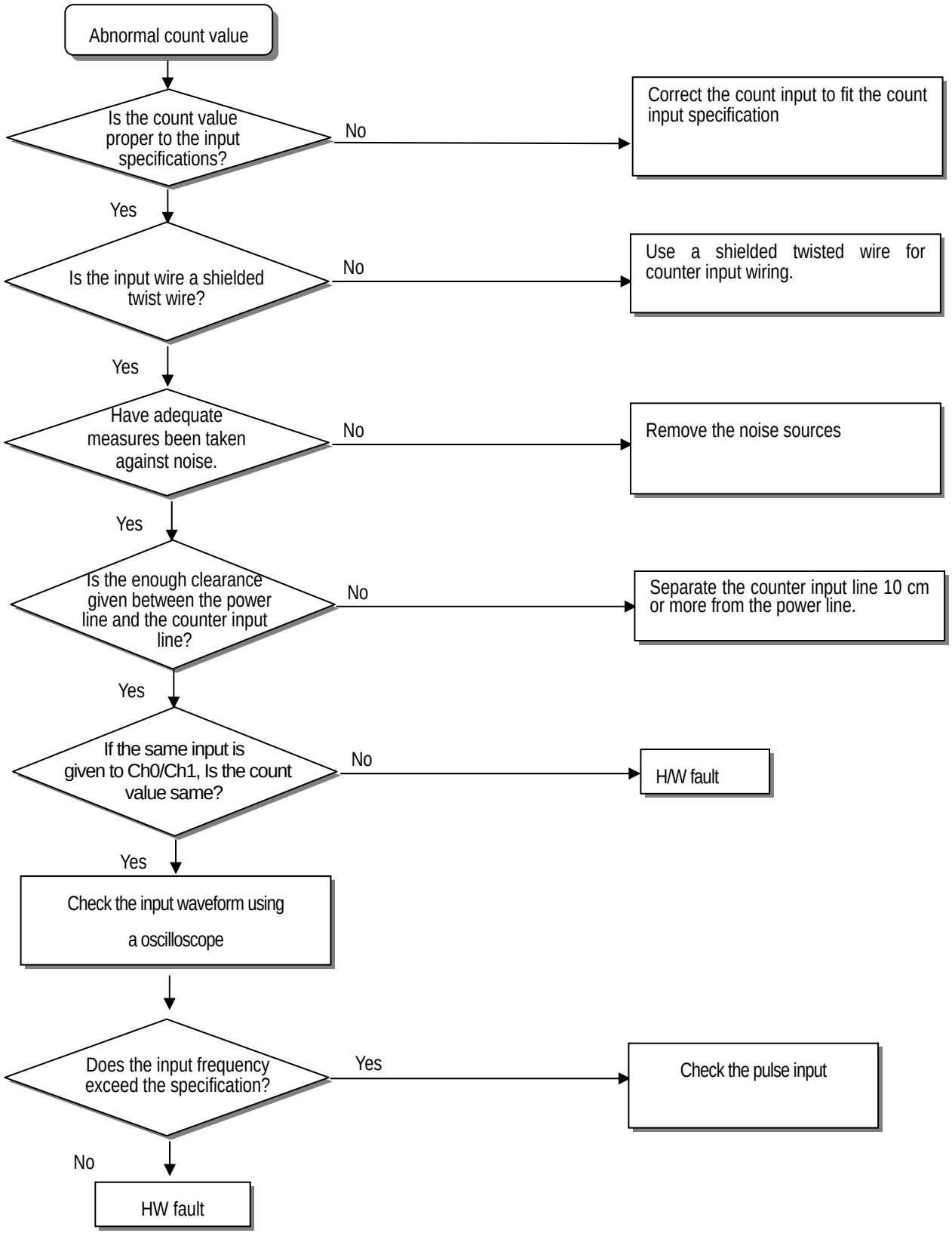
8.2.1 Incorrect LED status



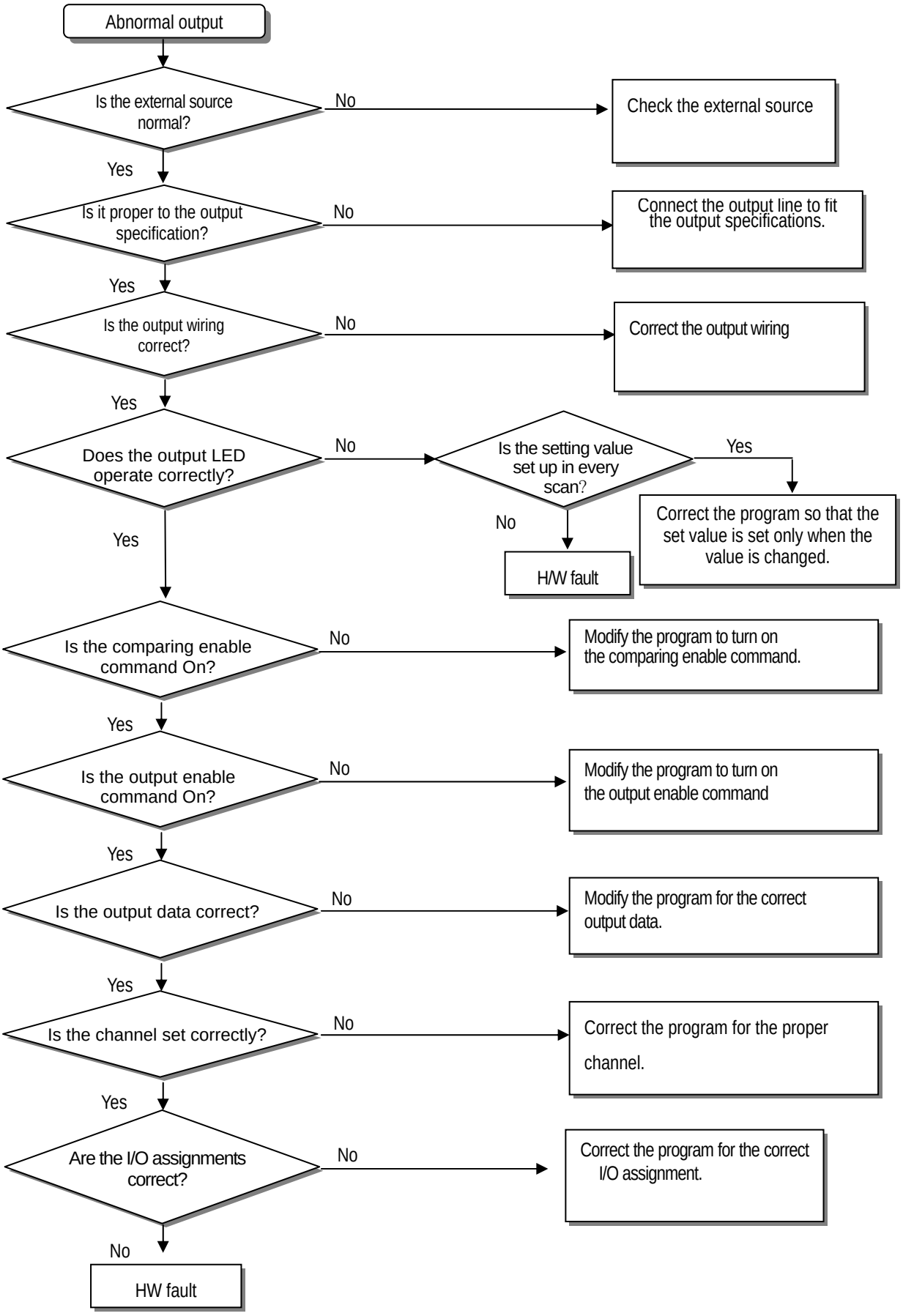
8.2.2 Abnormal count operation



8.2.3 Abnormal count value

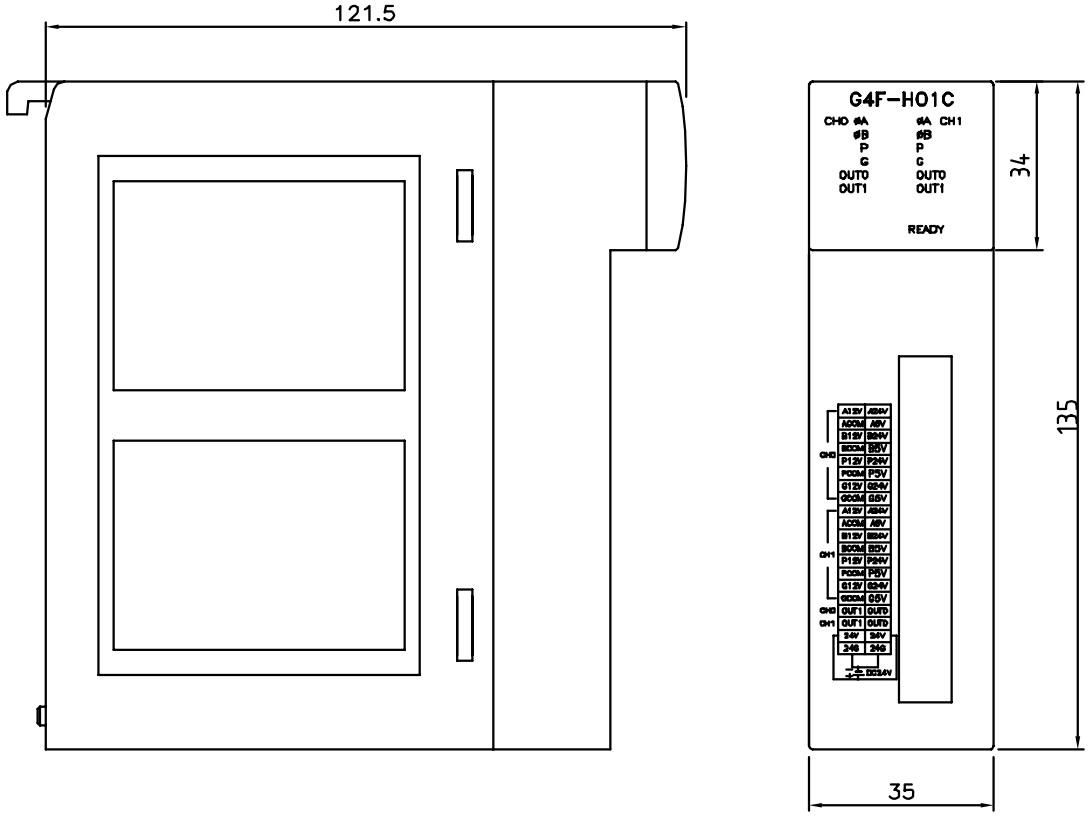


8.2.4 Abnormal output



Unit: mm

G4F-HD1C/G4F-HO1C



G6F-HD1C/G6F-HO1C