

Chapter 5. GM PROGRAMMING

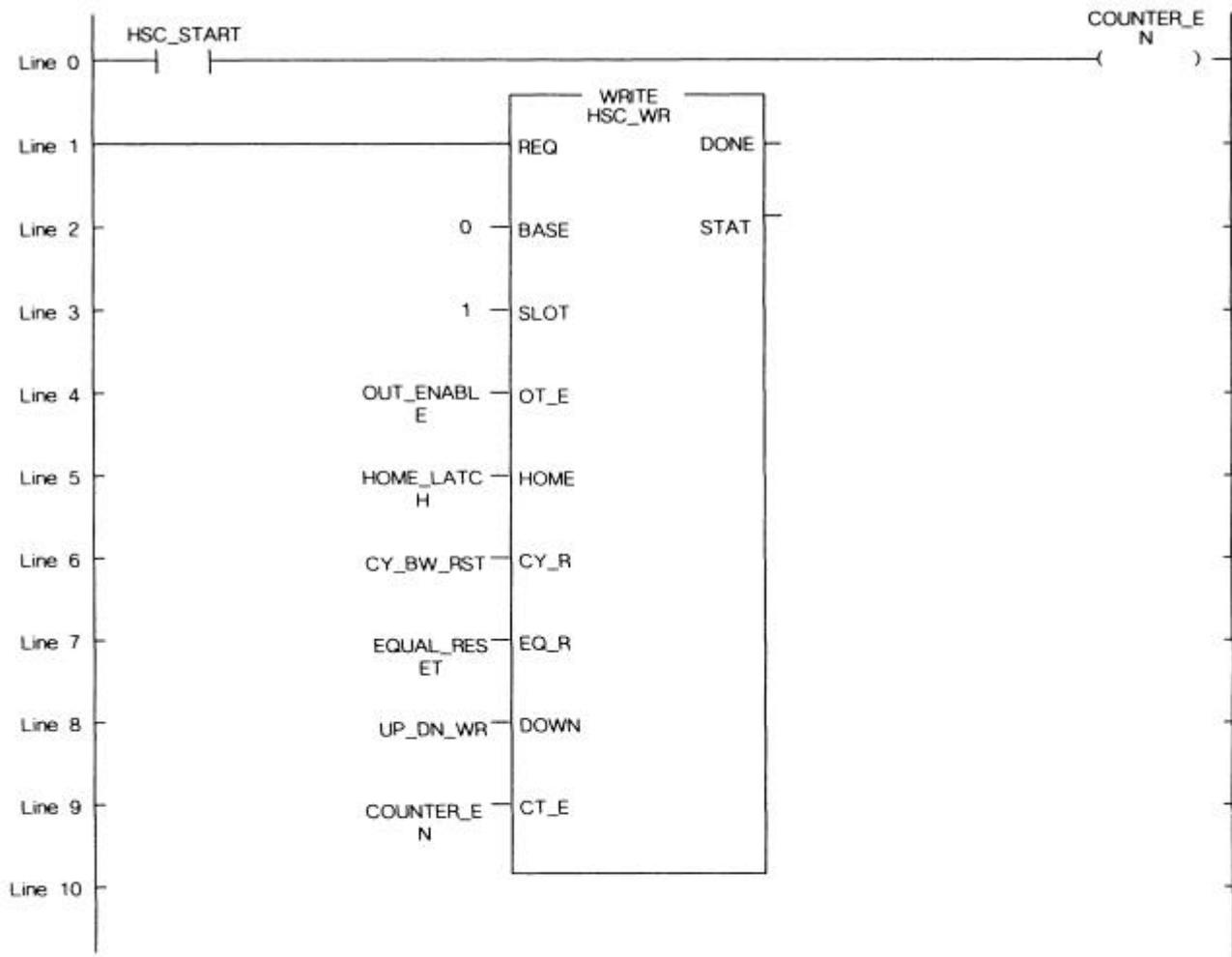
5.1 Programming Examples

If not especially noted, this section explains programming examples in reference with the G4F – HSCA that is loaded onto the system given below

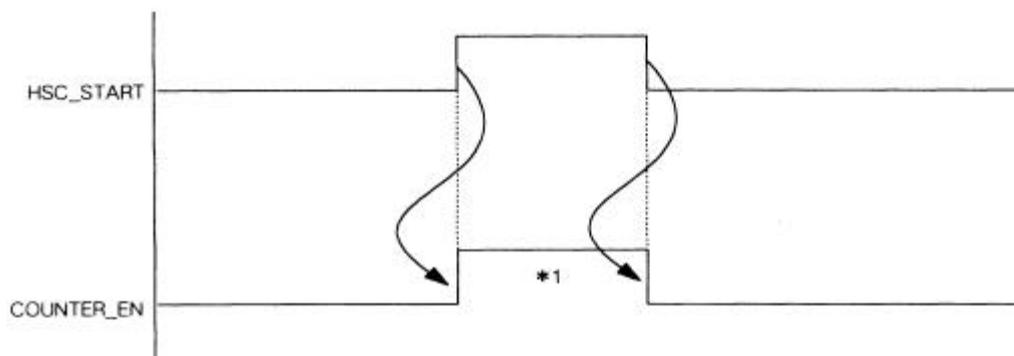
System configuration

GM4-PA2A	GM4-CPUA	G4I-D22A	G4F-HSCA	G4Q-TR2A	
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5.1.1 Enabling the count operation

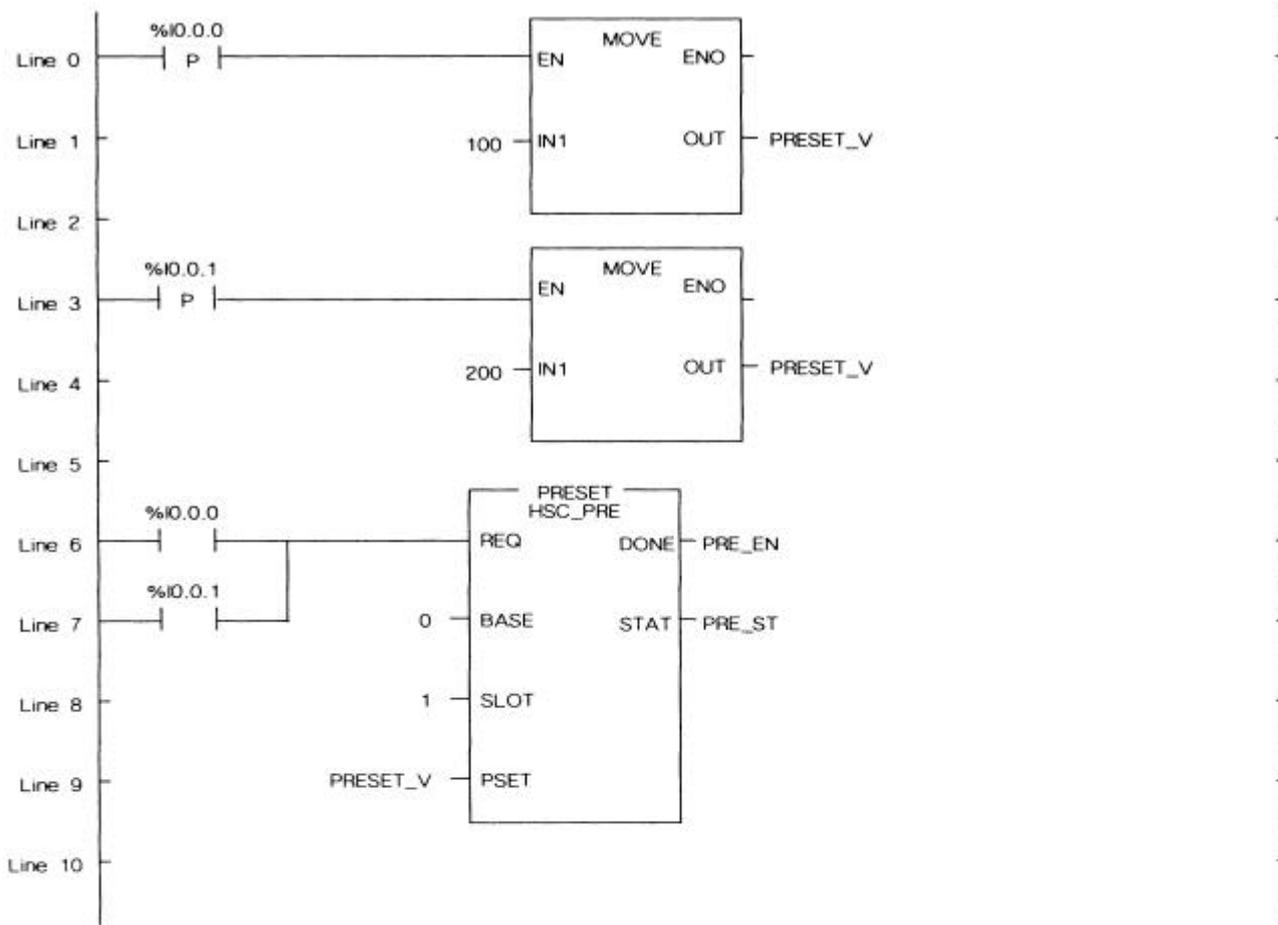


● Timing Diagram

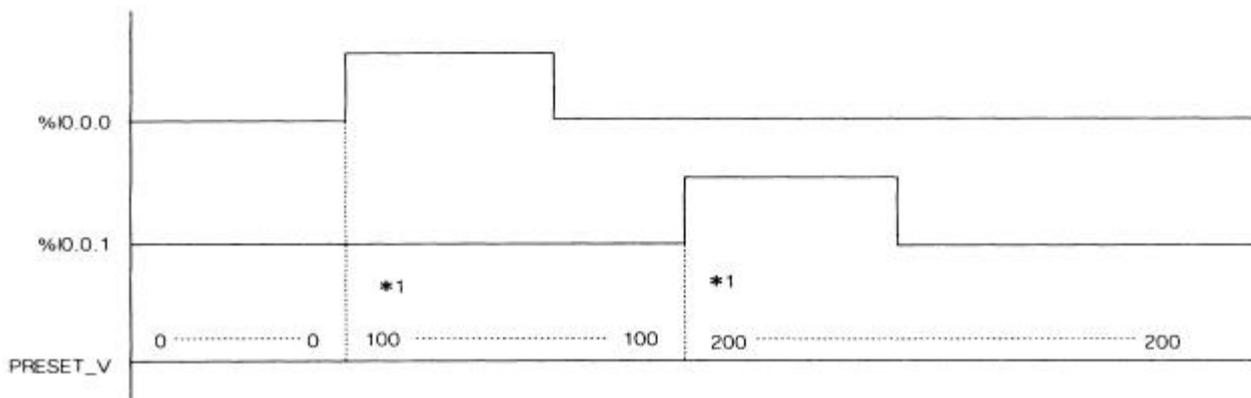


*1. Counting is only possible when the COUNTER_EN is turned on.

5.1.2 Preset

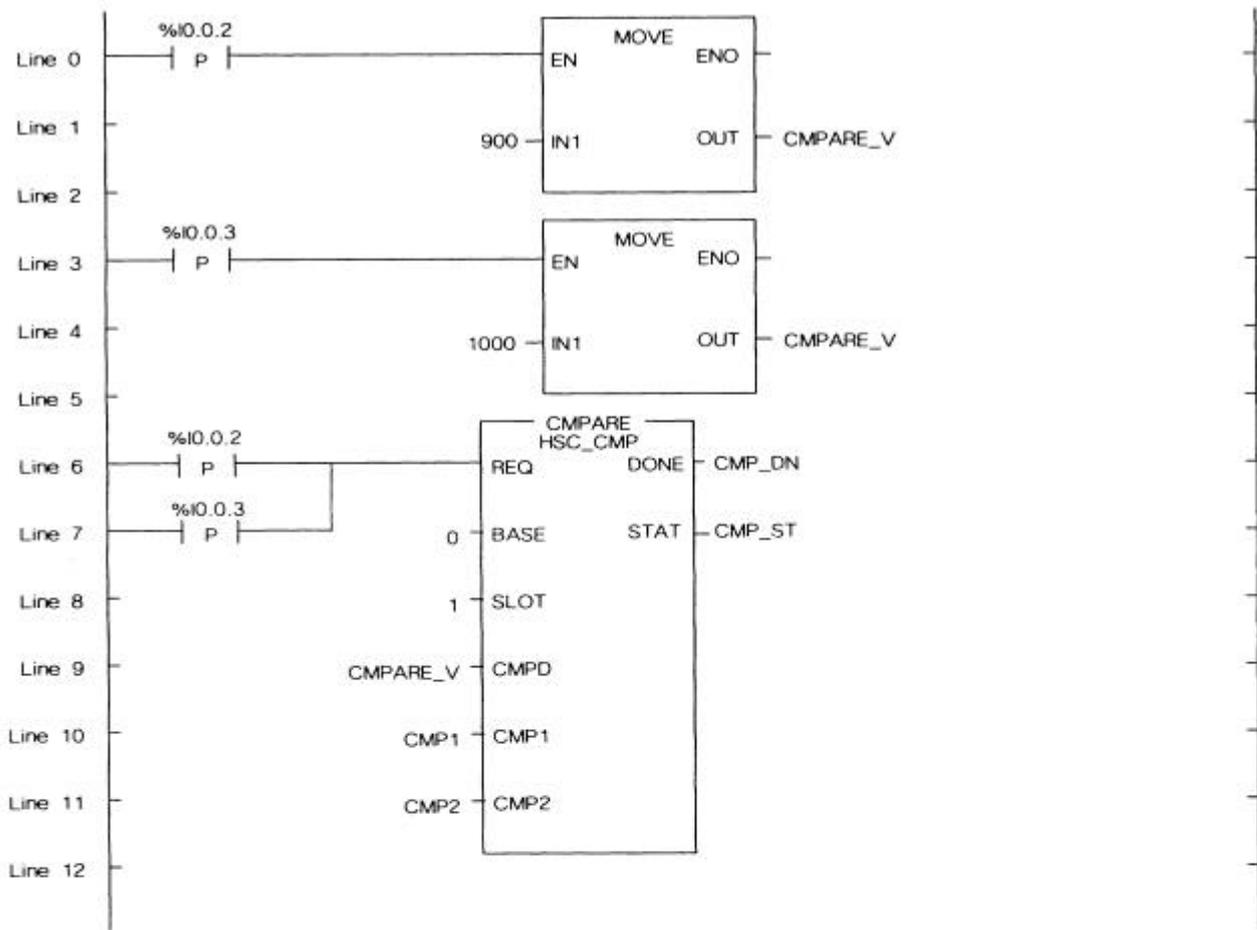


● Timing diagram

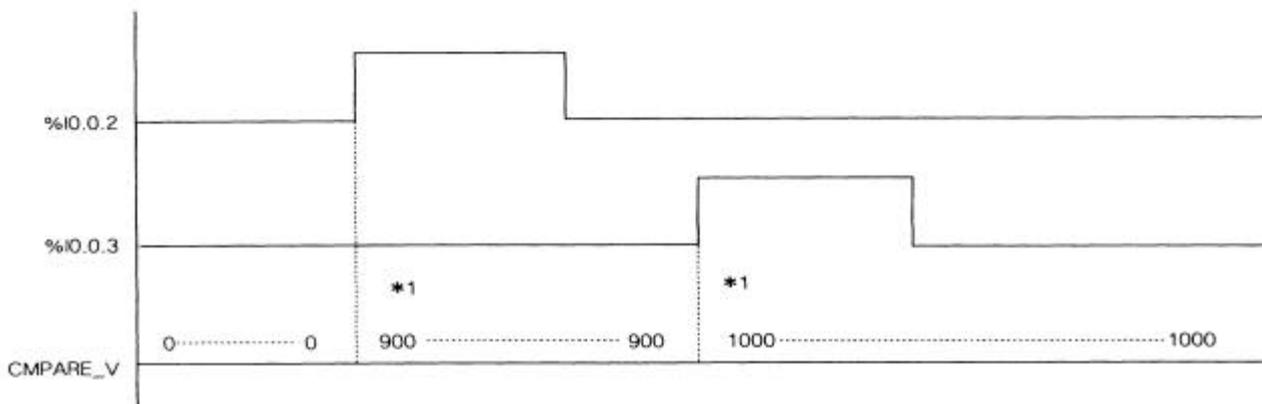


*The function block HSC_PRE will be processed for one scan.

5.1.3 Setting the comparison value

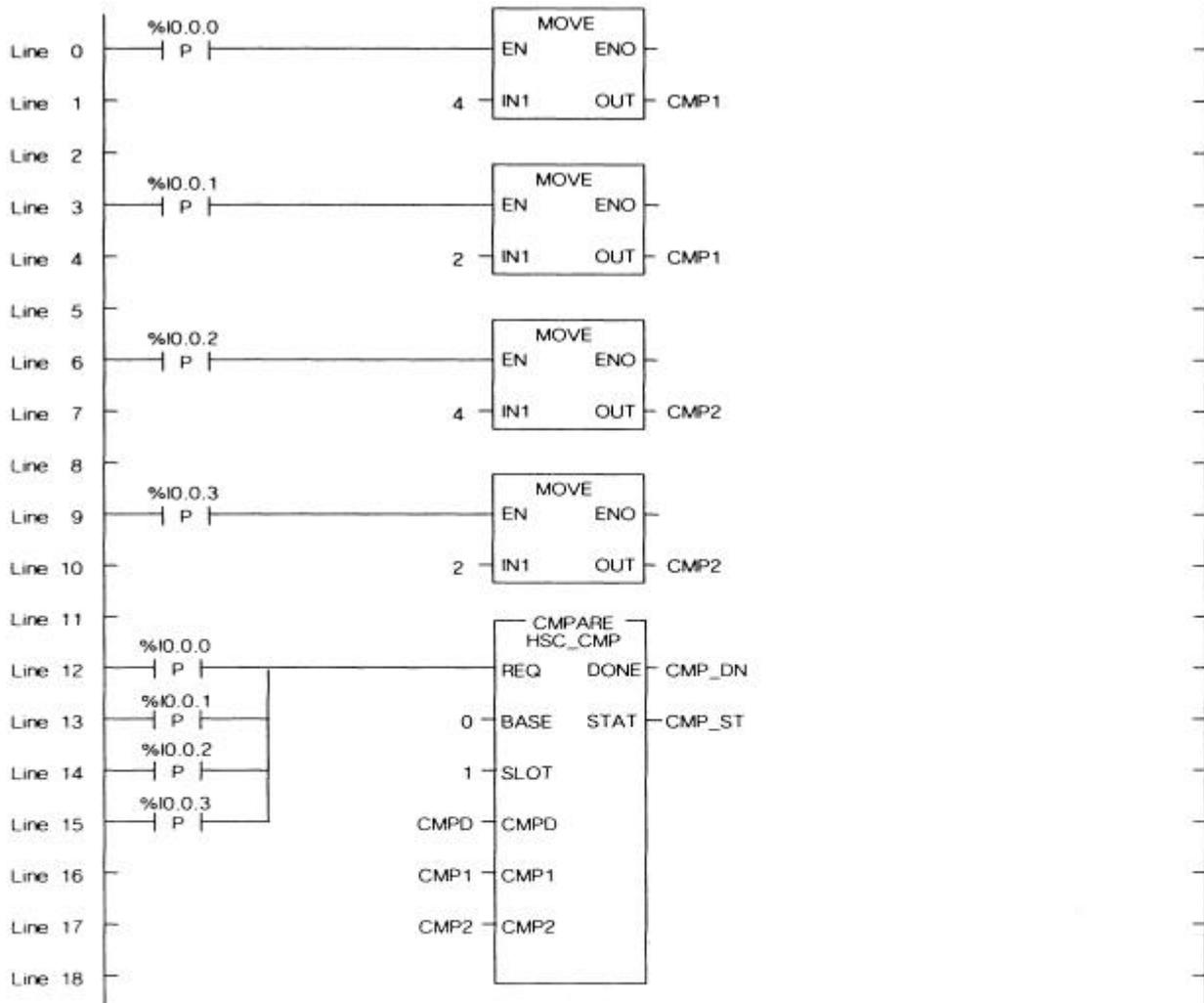


● Timing Diagram

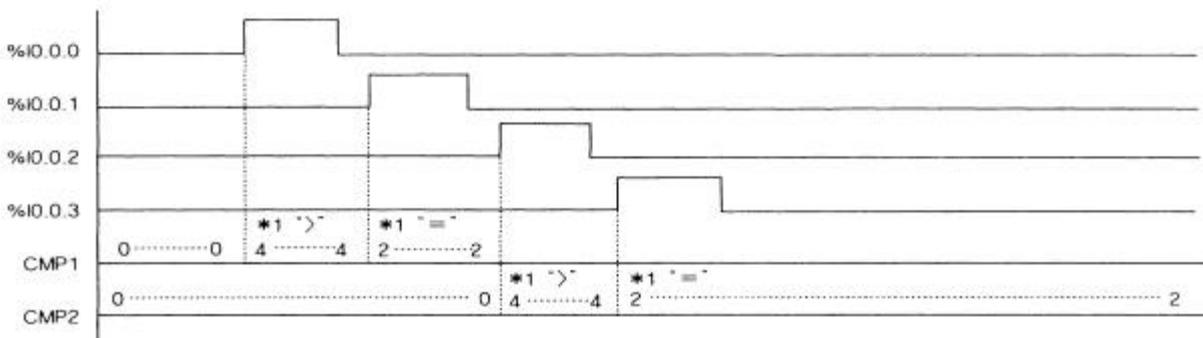


*1. The function block HSC_CMP will be processed for one scan.

5.1.4 Setting the magnitude comparison values

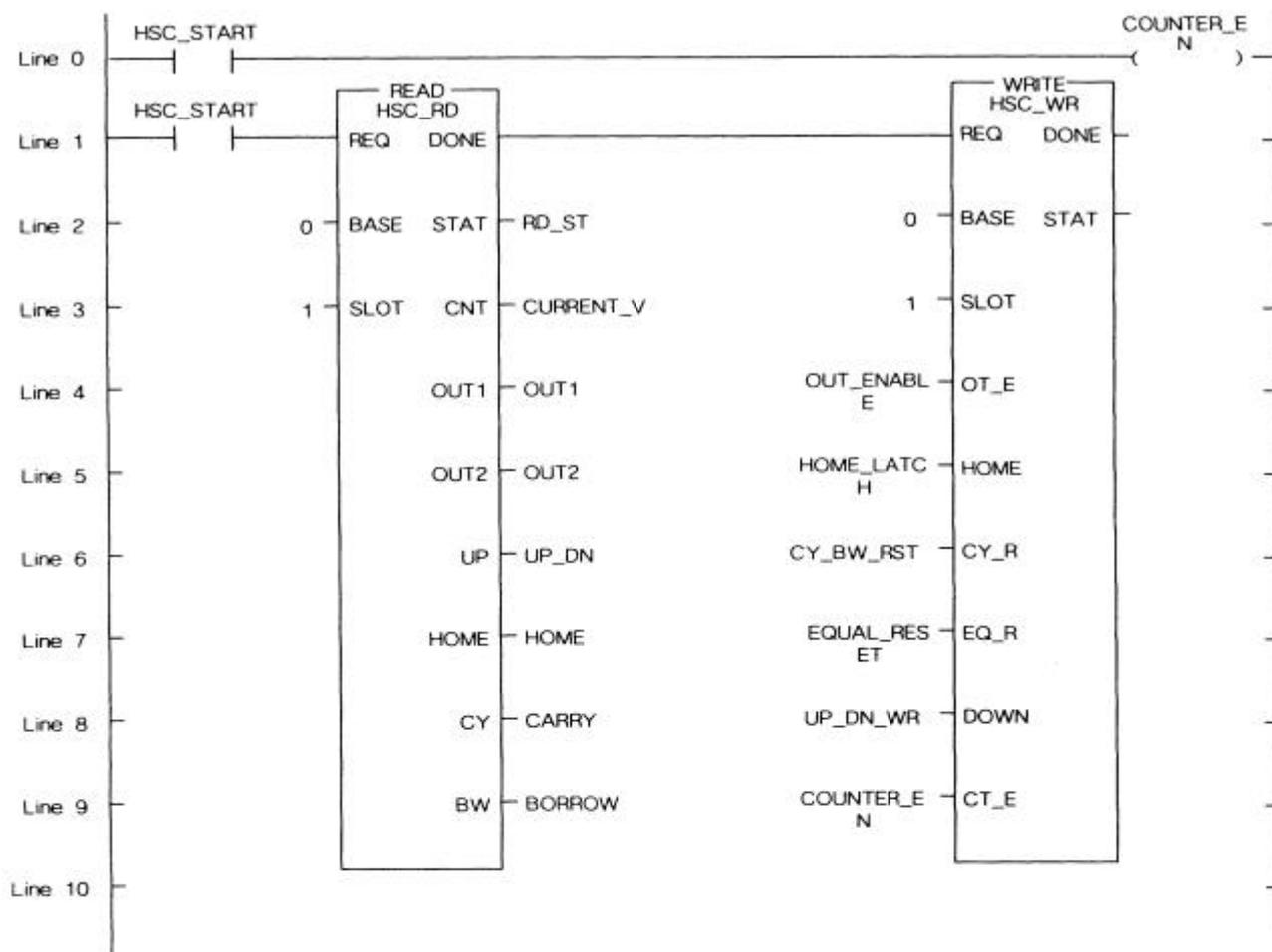


● **Timing Diagram**

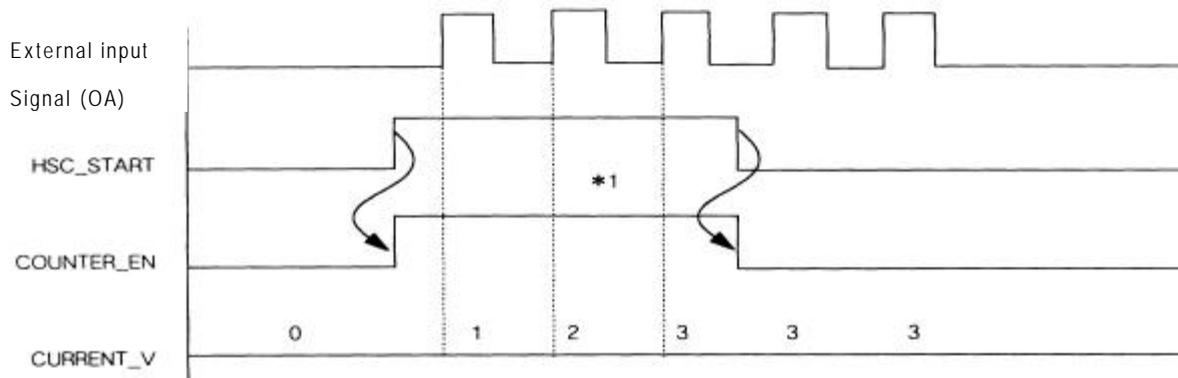


*1.The function block HSC_CMP will be processed for one scan.

5.1.5 Reading the current count value

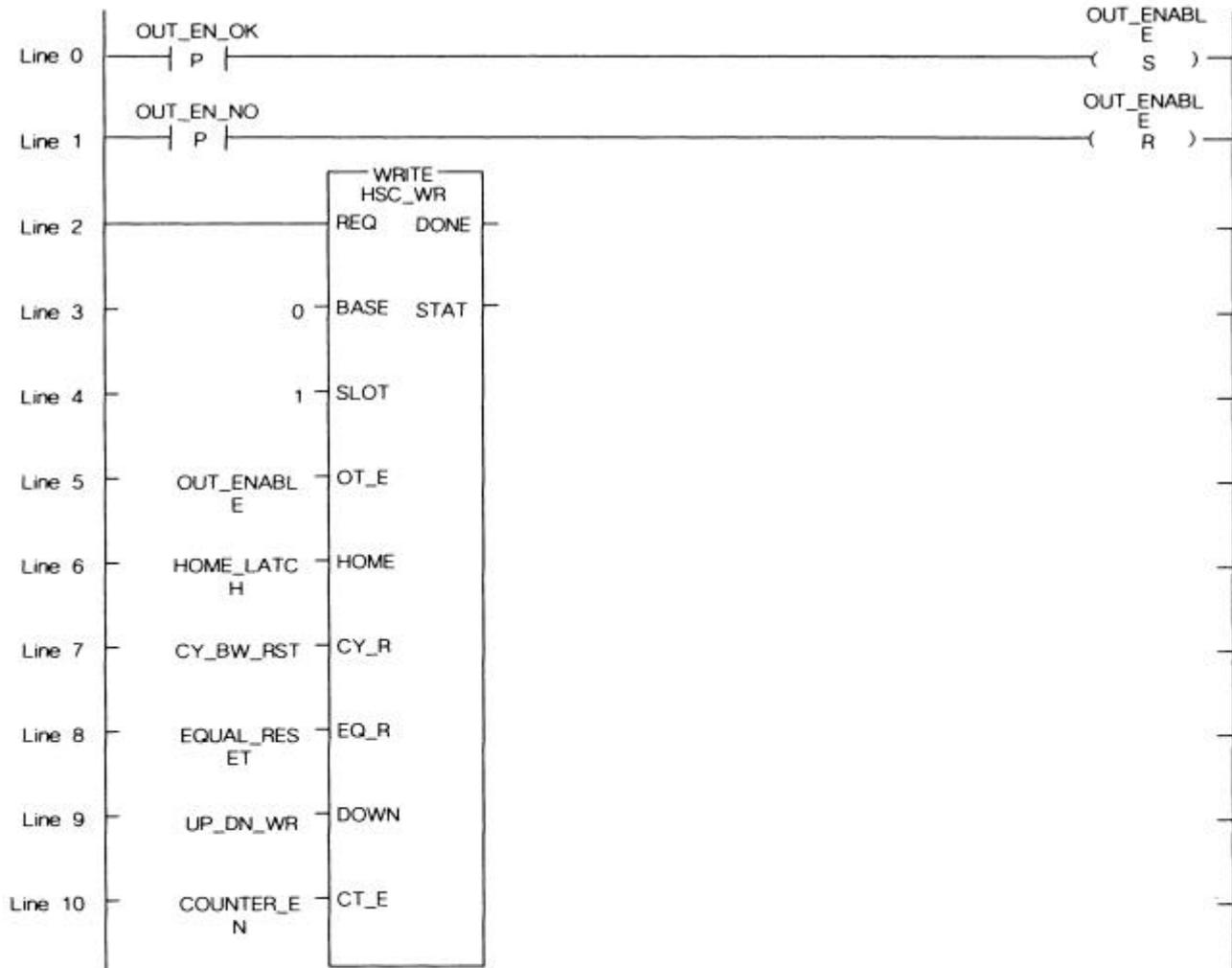


● Timing Diagram

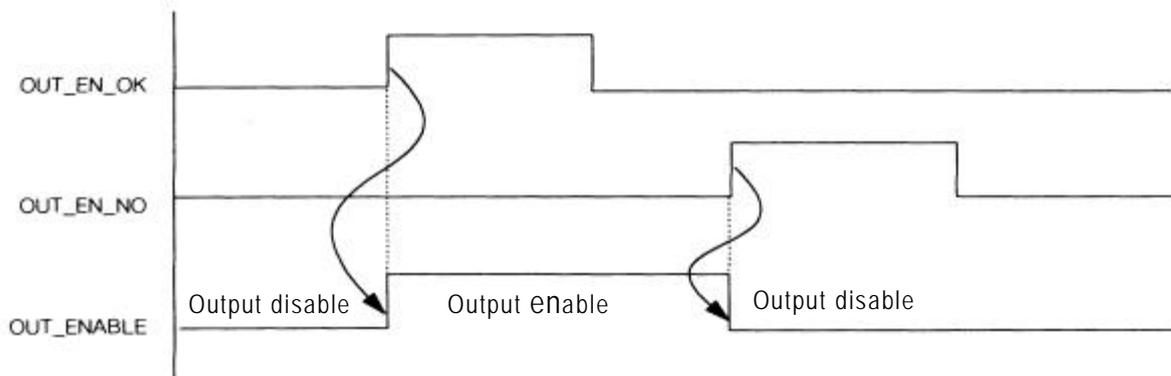


*1. The current count value (CNT) is read only when the COUNTER_EN is turned on.

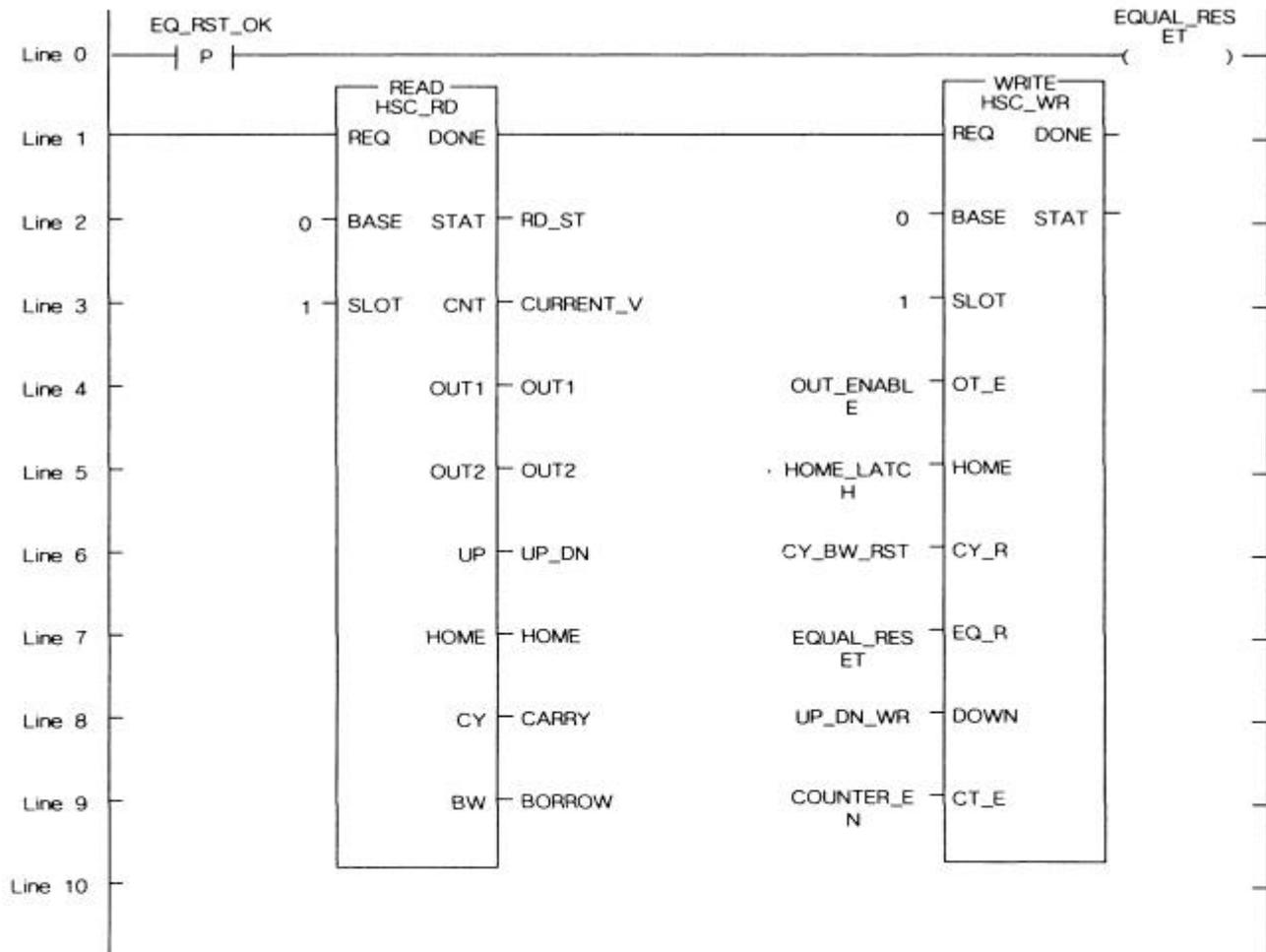
5.1.6 Enabling the external output



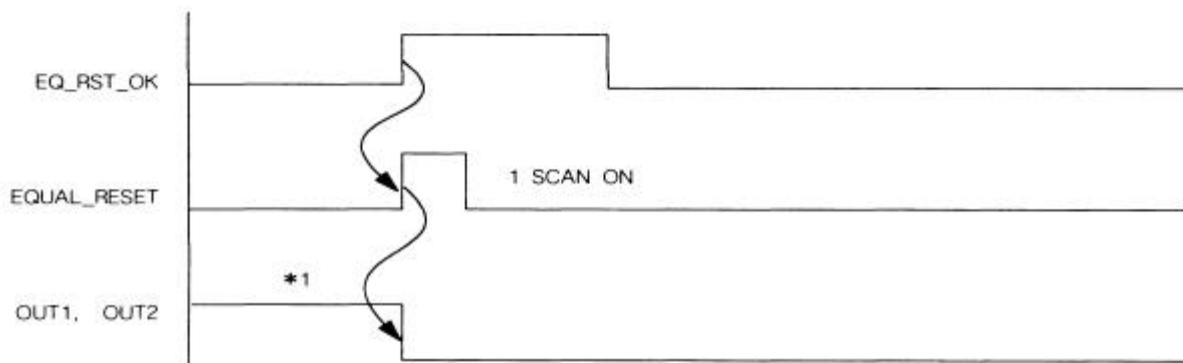
● Timing Diagram



5.1.7 Coincidence reset

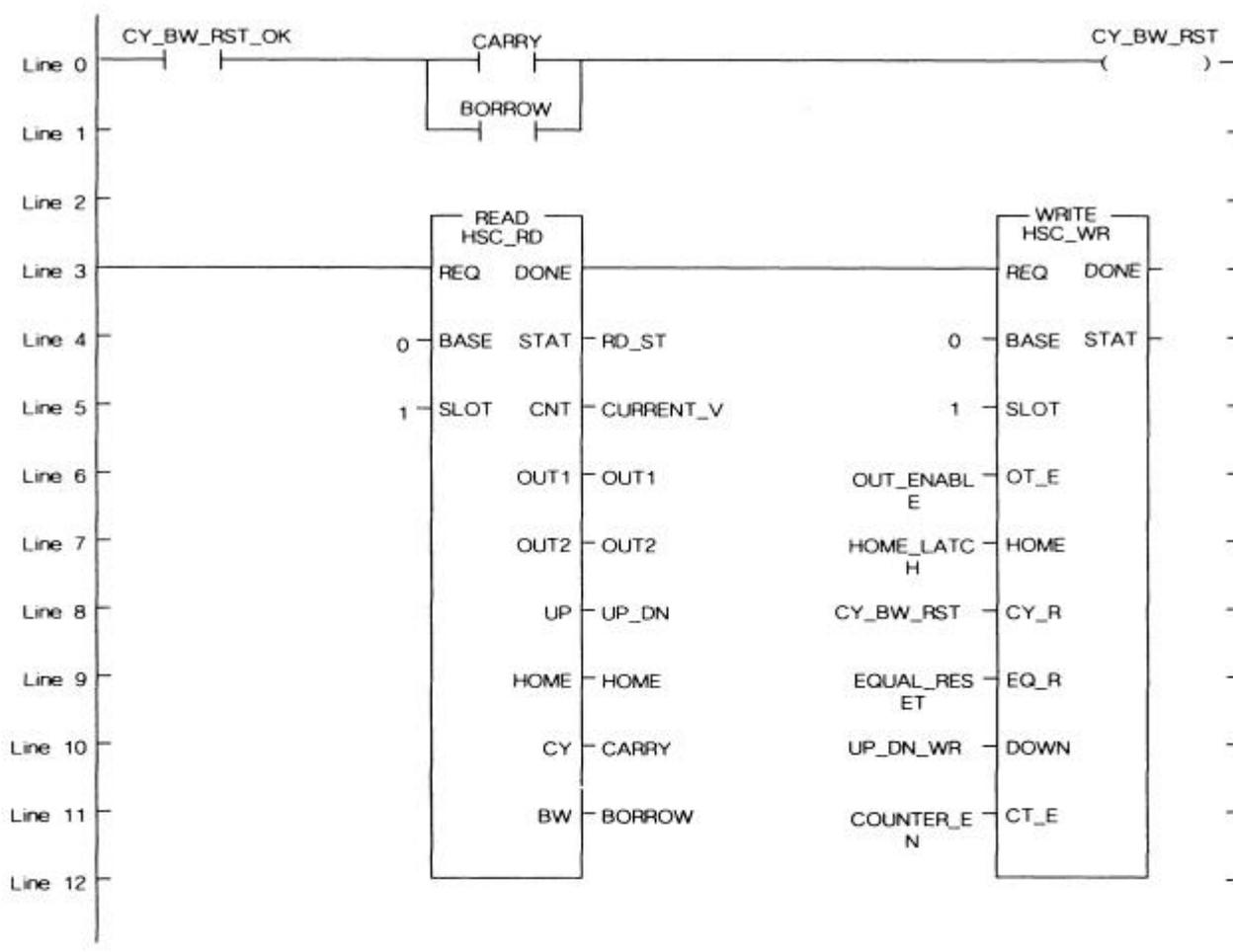


● **Timing Diagram**

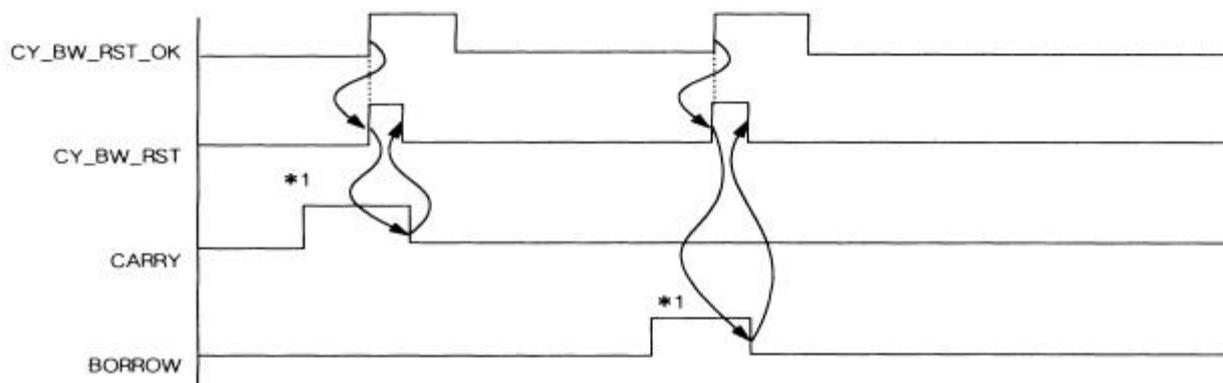


*1. This occurs only when the comparison values 1 and 2 are set to "=", " ≥ ", or " ≤ " and the current count value (CNT) equal to the comparison value (CMPD)

5.1.8 Carry / Borrow reset



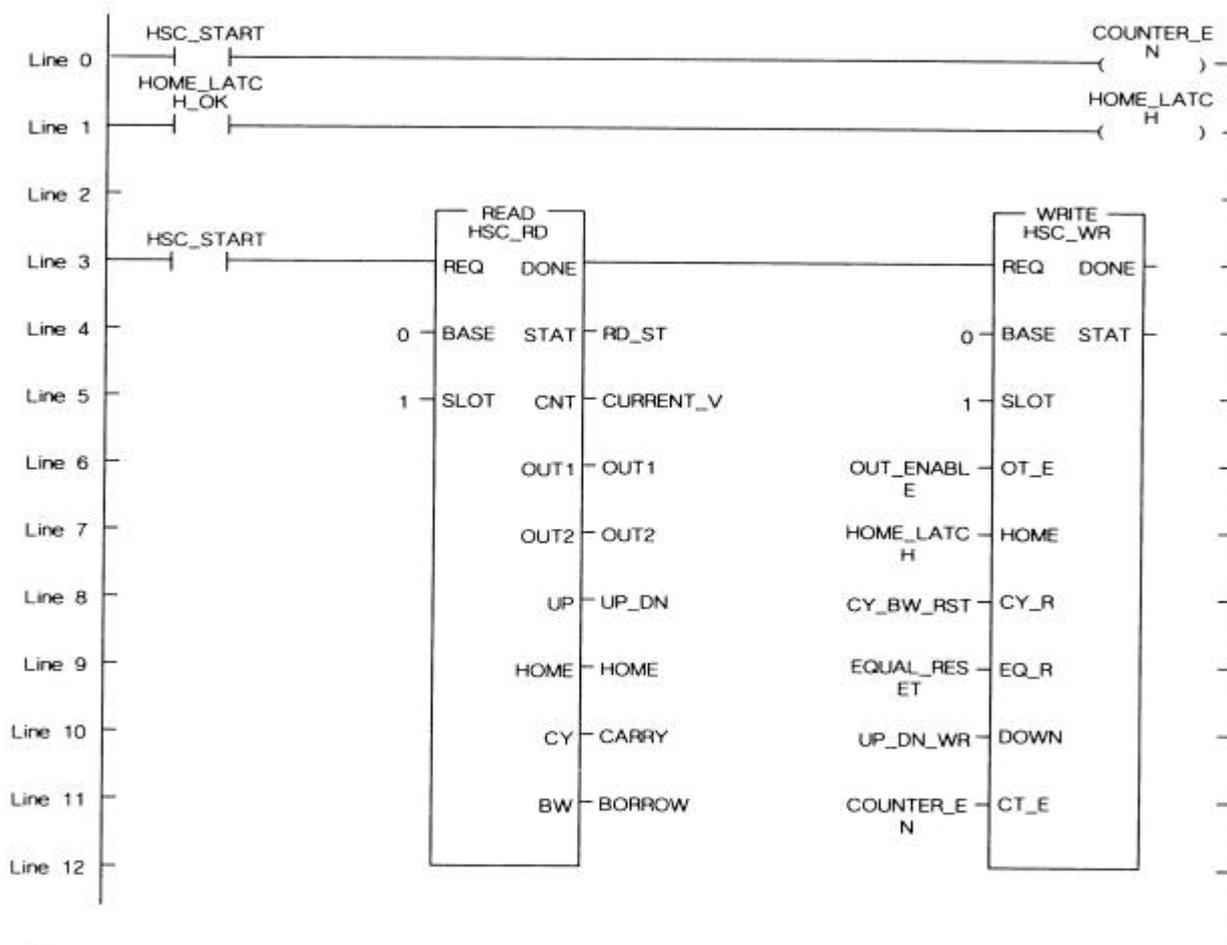
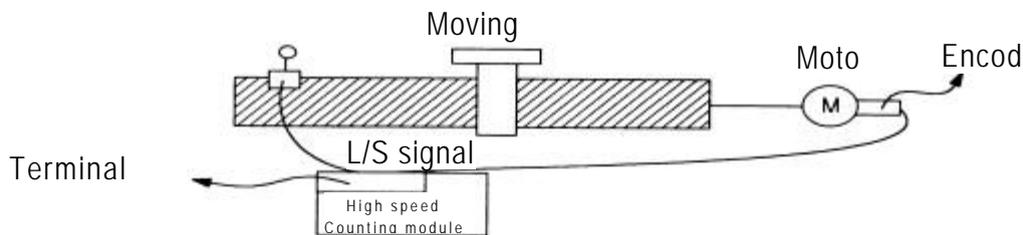
● Timing Diagram



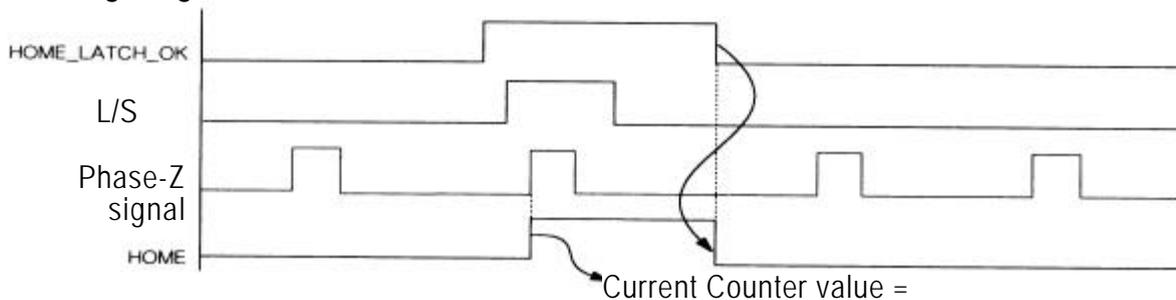
*1. Carry, Borrow signal occurs when the Current count value changes from 16,777,215 to 0 from 0 to 16,777,215

5.1.9 Enabling the home latch

Home Latch enable signal is used to set the current count value to 0 when the mechanical reference point has been reached.

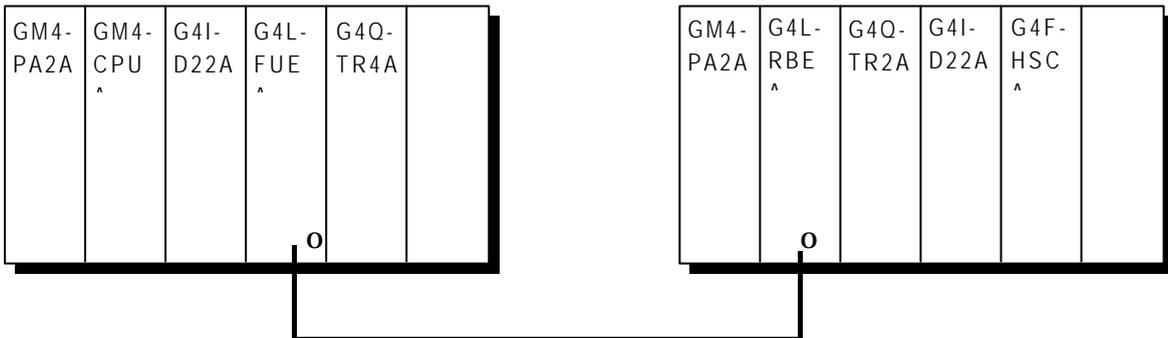


● Timing diagram



5.1.10 Read/ Write when the high speed counter module is mounted onto the remote station

System configuration



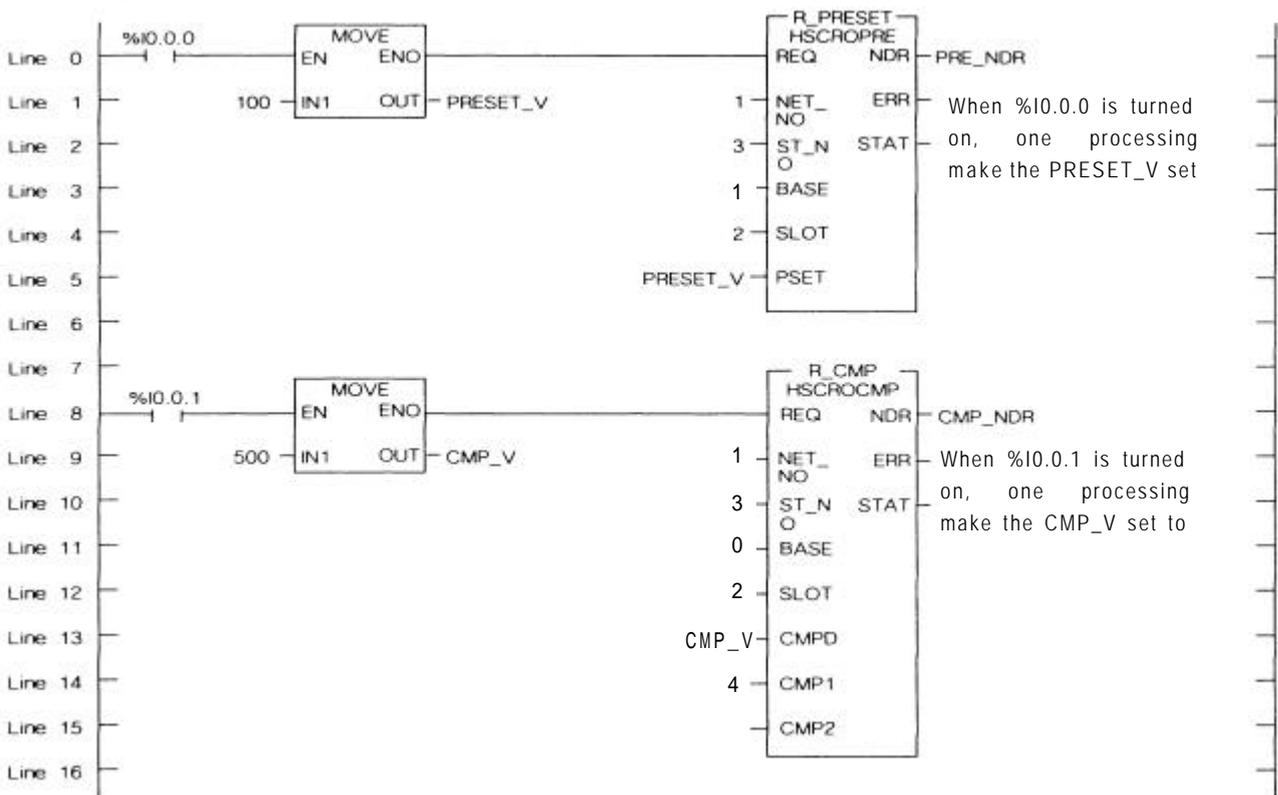
NET-NO : The number of the slot where the G4L – FUEA is loaded = 1

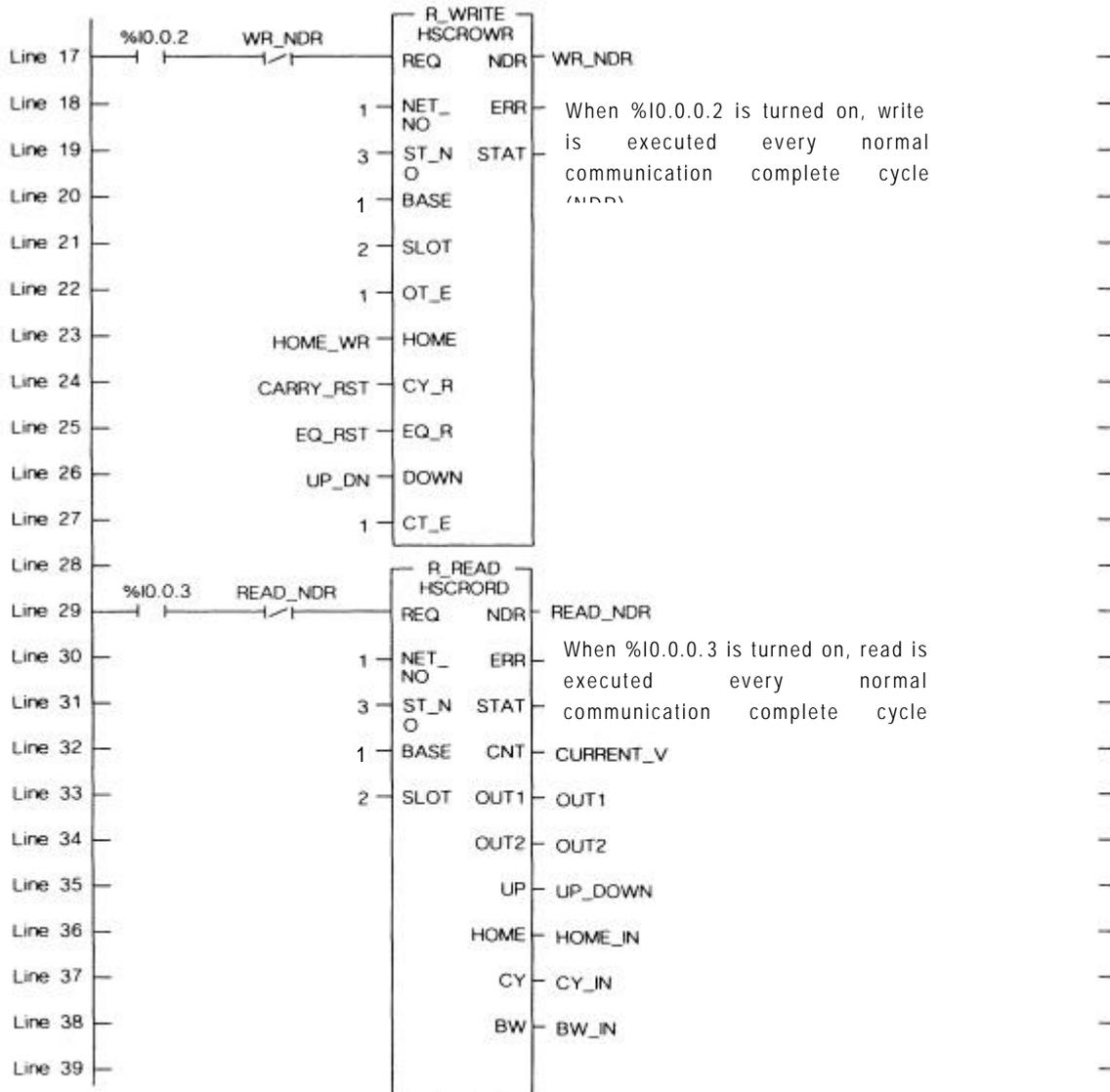
ST-NO : G4L-RBEA Station No. = 3

BASE : The number of the base unit where the G4F – HSCA is loaded = 1

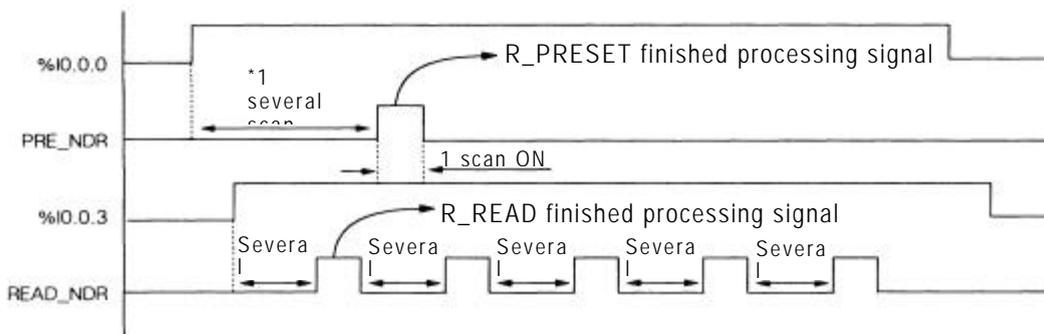
SLOT : The number of the slot where the G4F – HSCA is loaded = 2

Program





● Timing Diagram

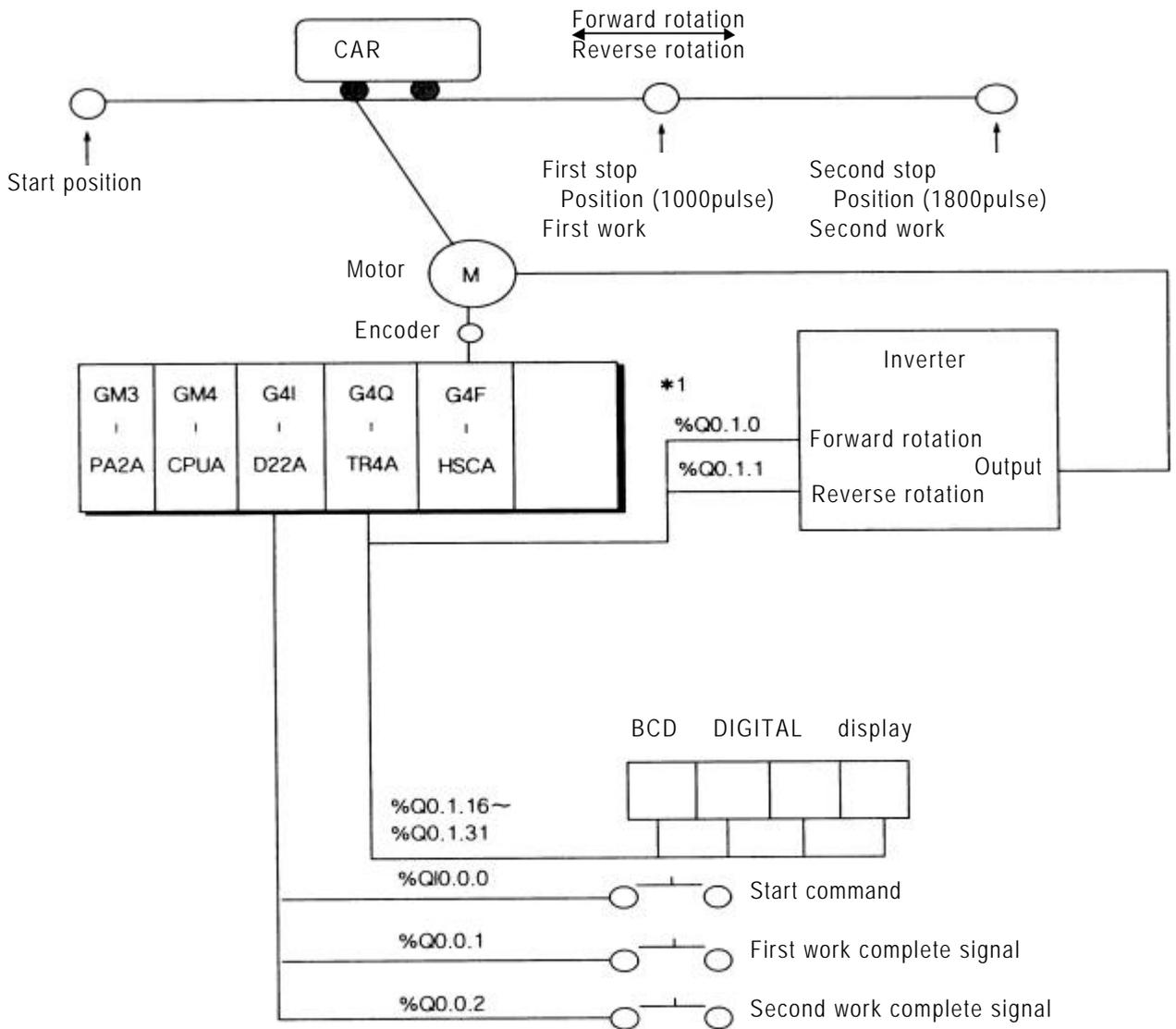


*1. It is normal communication complete cycle, and it extents in proportion with quantity of communication data and the number of stations connected to the communication module.

5.2 Application Examples

5.2.1 Program for moving the cart

● System Configuration



- GM4 – CUPA : GM4 CPU Module
- G4I – D22A : DC Input Module (16
- G4Q – TR4A : TR Output Module (32 Point)
- G4F – HSCA : High-speed counting module

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 counting 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

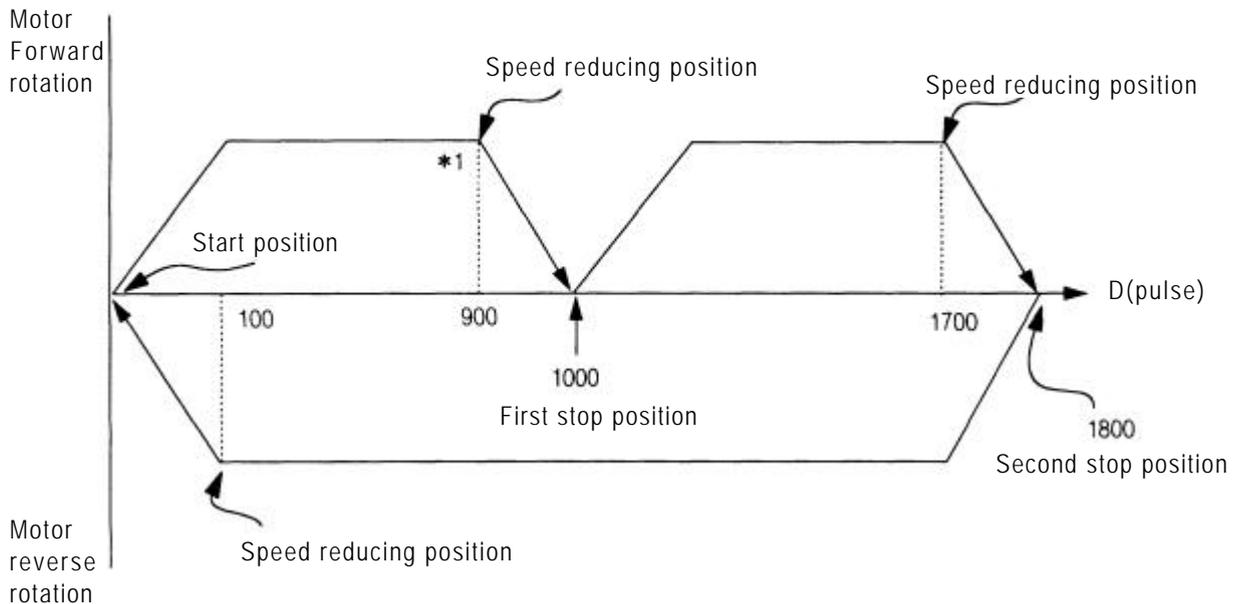
%I0.0.0 : Start Command
 %I0.0.1 : 1st Work Complete Signal
 %I0.0.2 : 2nd Work Complete Signal

} Input

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

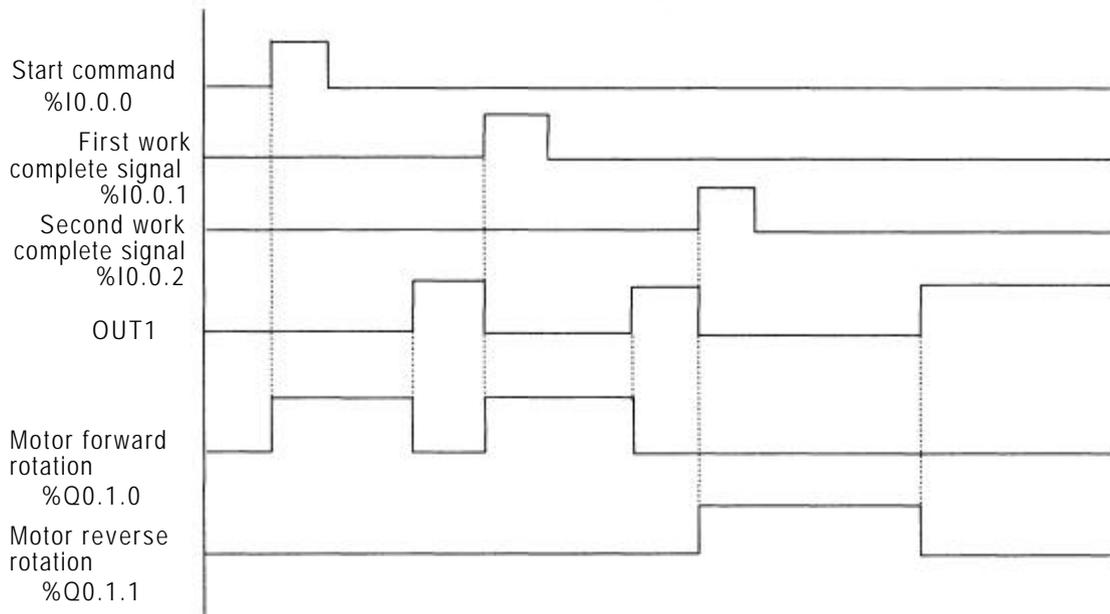
} Output

● **Driving mode**



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

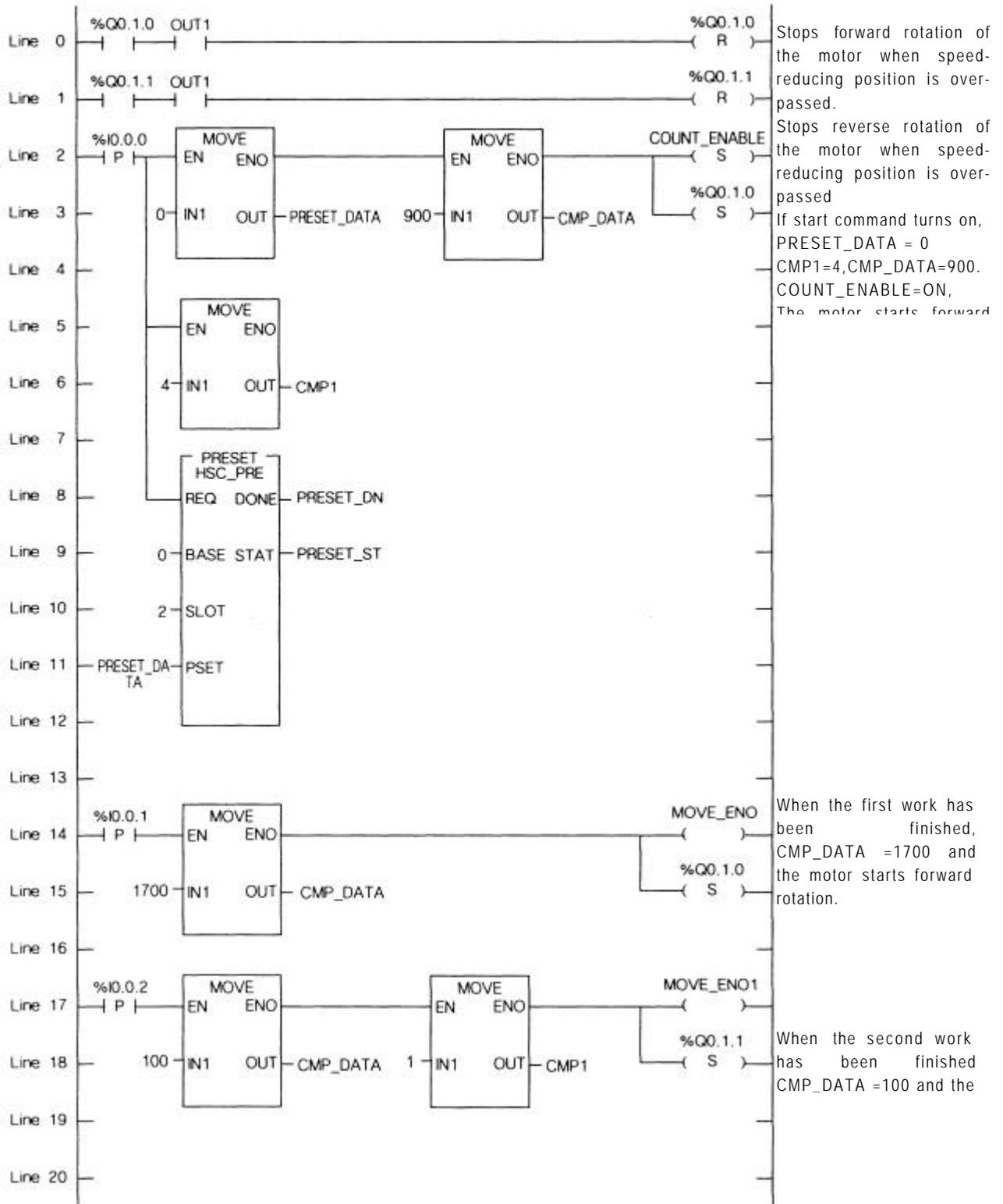
● Operation

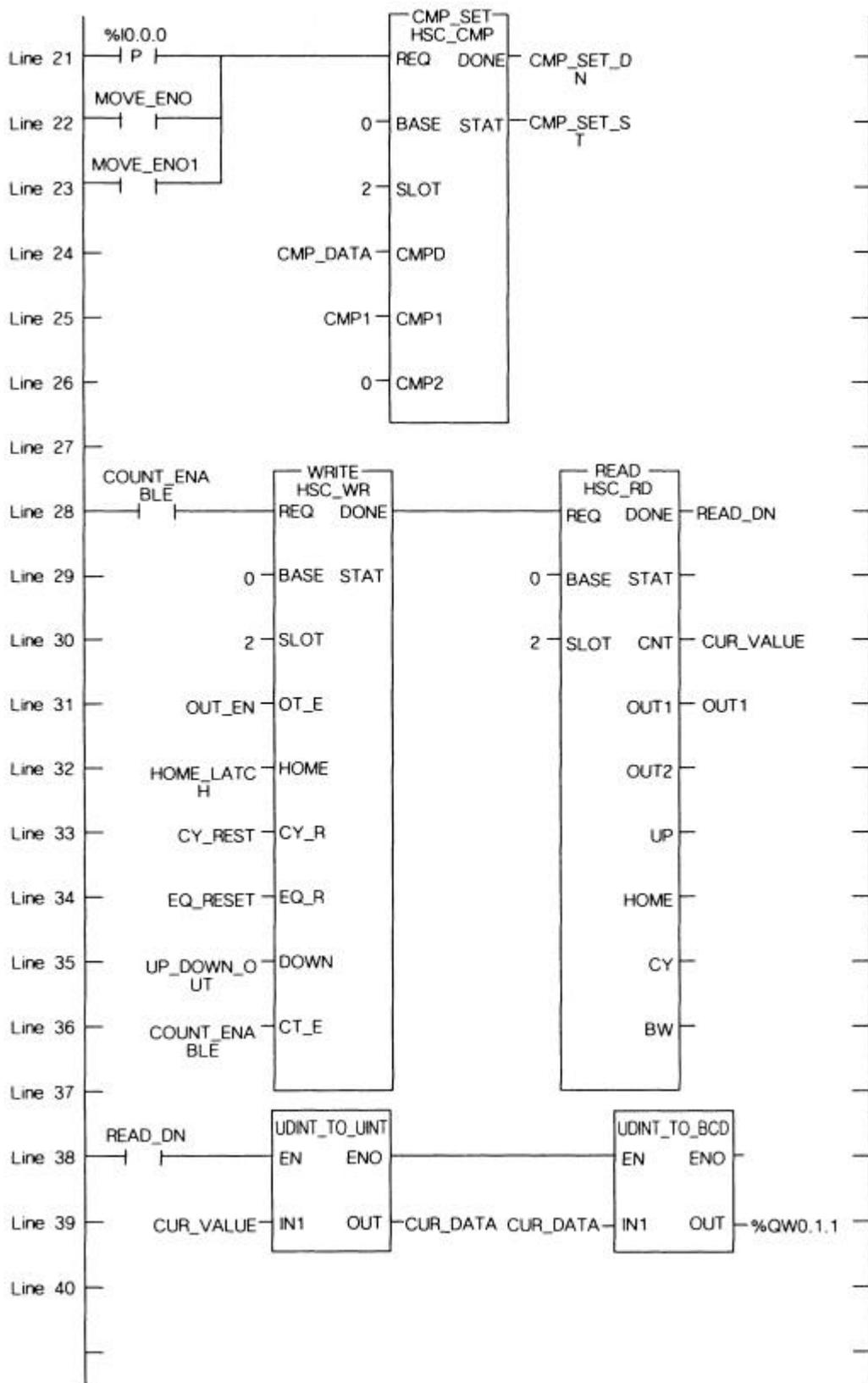


● Used Variable List

Variable Name	Var_Kind	Data Type	(AT Address)	(Initial Value)
CMP_DATA	: VAR	: UDINT		
CMP_SET	: VAR	: FB Instance		
CMP_SET_DN	: VAR	: BOOL		
CMP_SET_ST	: VAR	: USINT		
CMP1	: VAR	: BYTE		
COUNT_ENABLE	: VAR	: BOOL		
CUR_DATA	: VAR	: UINT		
CUR_VALUE	: VAR	: UDINT		
CY_REST	: VAR	: BOOL		
EQ_RESET	: VAR	: BOOL		
HOME_LATCH	: VAR	: BOOL		
MOVE_ENO	: VAR	: BOOL		
MOVE_ENO1	: VAR	: BOOL		
OUT_EN	: VAR	: BOOL		
OUT1	: VAR	: BOOL		
PRESET	: VAR	: FB Instance		
PRESET_DATA	: VAR	: UDINT		
PRESET_DN	: VAR	: BOOL		
PRESET_ST	: VAR	: USINT		
READ	: VAR	: FB Instance		
READ_DN	: VAR	: BOOL		
UP_DOWN_OUT	: VAR	: BOOL		
WRITE	: VAR	: FB Instance		

● Program





When first or second works or start command have been finished, `CMP_DATA` will be

Write/read are executed whenever `COUNT_ENABLE = ON`

The High Speed Counter Module outputs the current count value (`CUR_VALUE`) on the digital display.