

## Chapter 5. PROGRAMMING

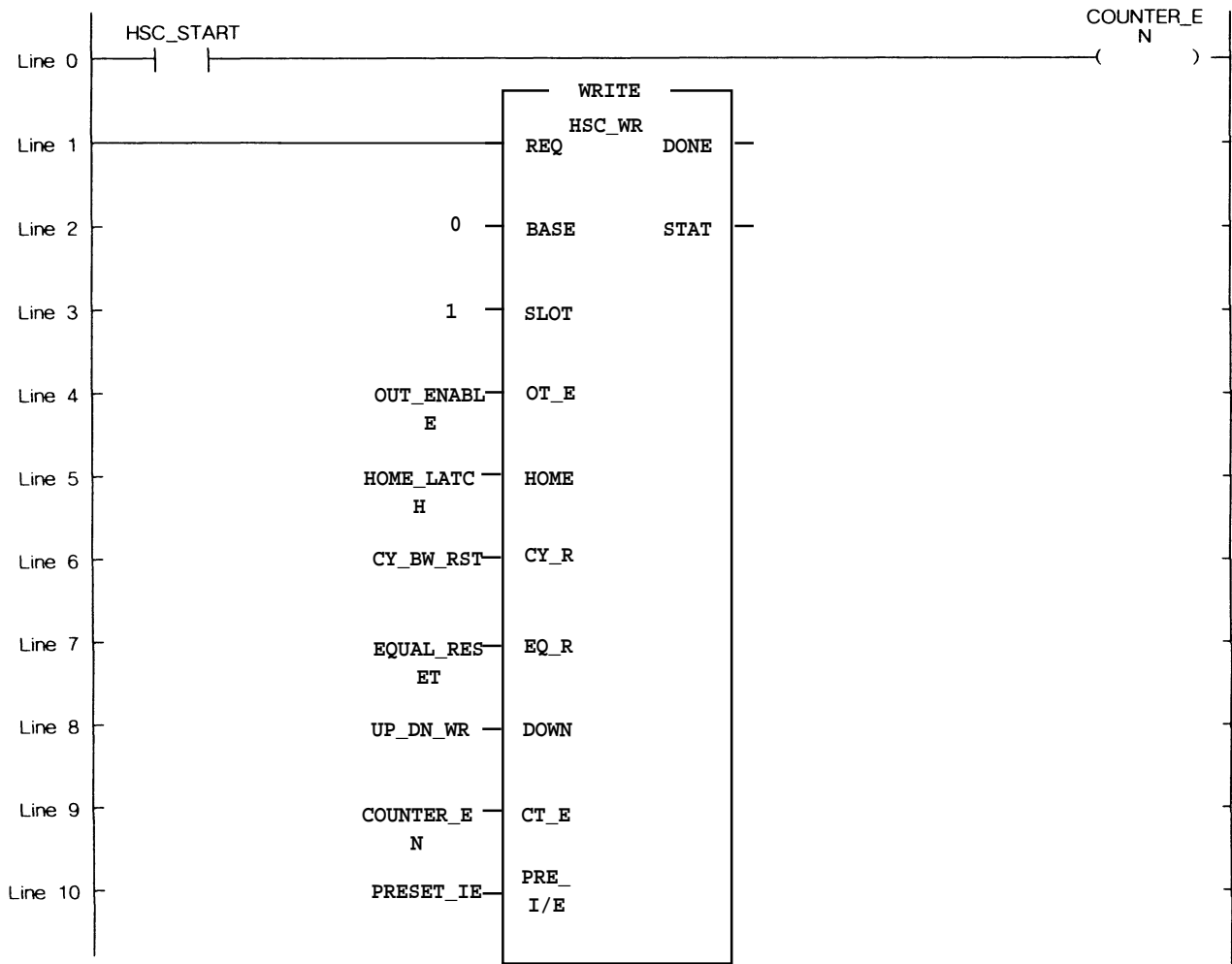
### 5.1 Programming Examples

If not especially noted, this section explains programming examples in reference with the G6F – HSCA that is loaded onto the system given below

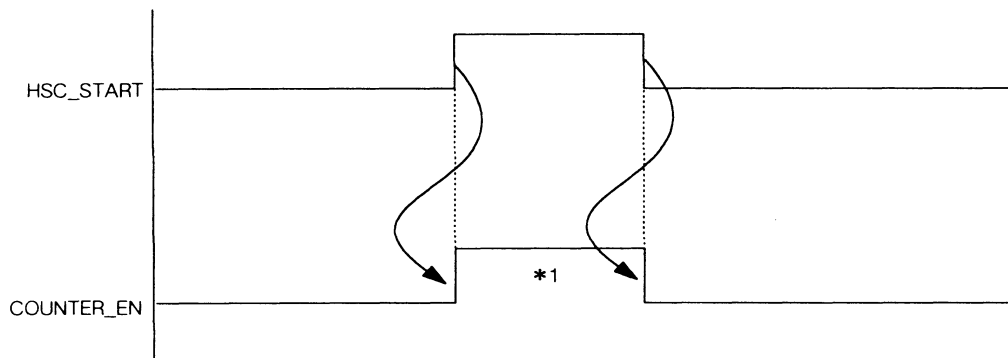
#### SYSTEM CONFIGURATION

POWER	C P U	16-point DC input	G6F - H S C A	16 point transistor output	
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### 5.1.1 Enable Counter Operation (CT\_E)

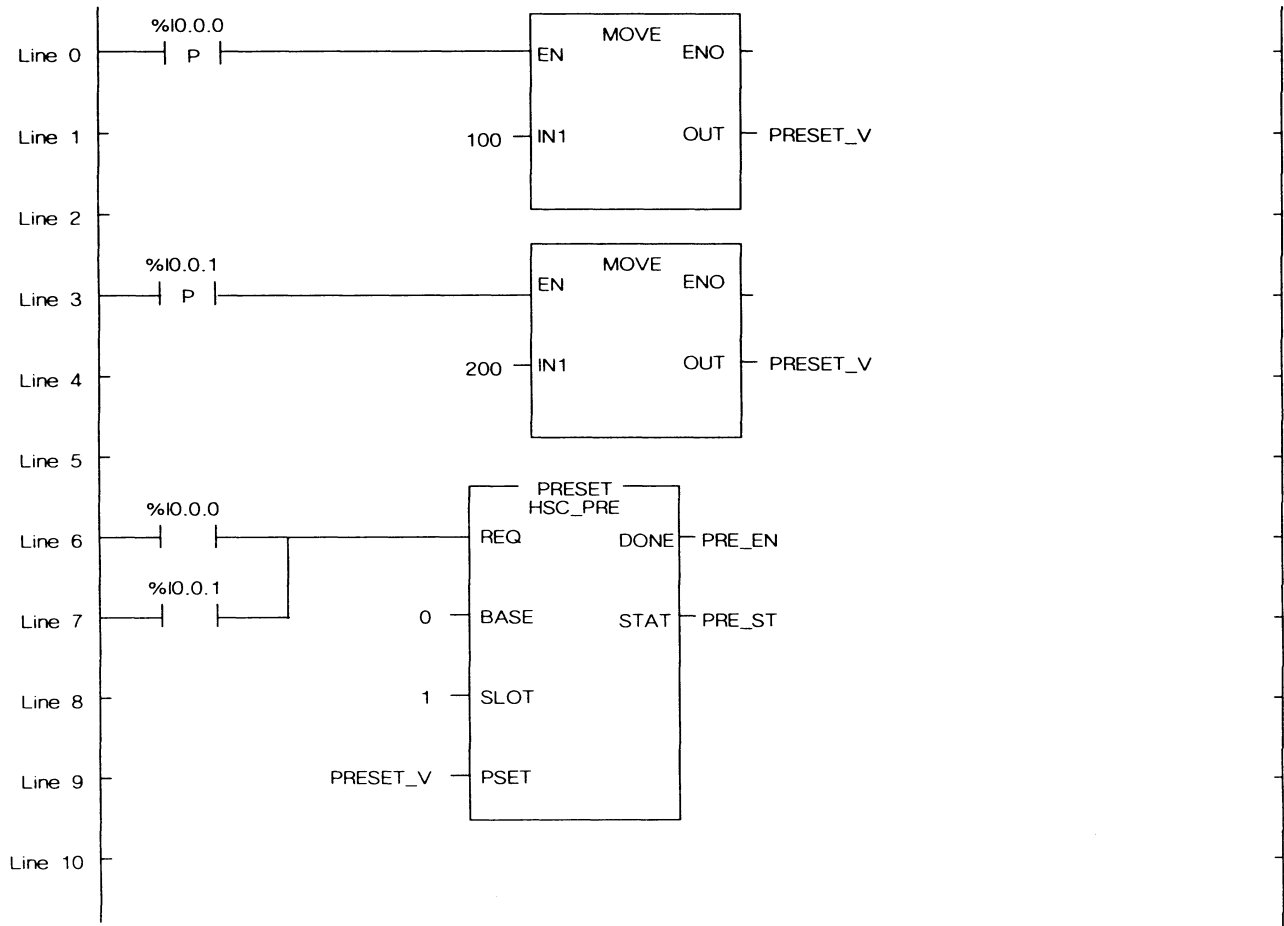


● Timing Diagram

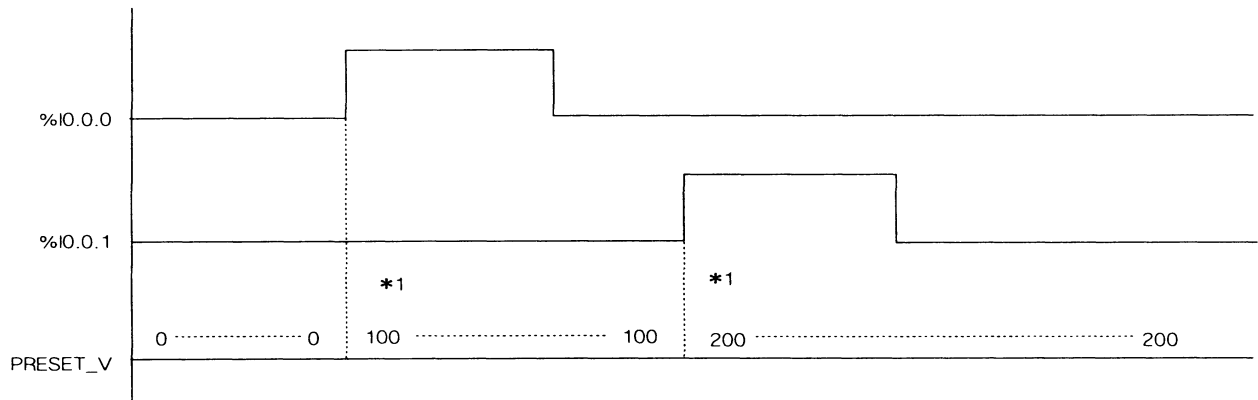


\*1. Counting is only possible when the COUNTER\_EN is turned on.

### 5.1.2 Preset (PSET)

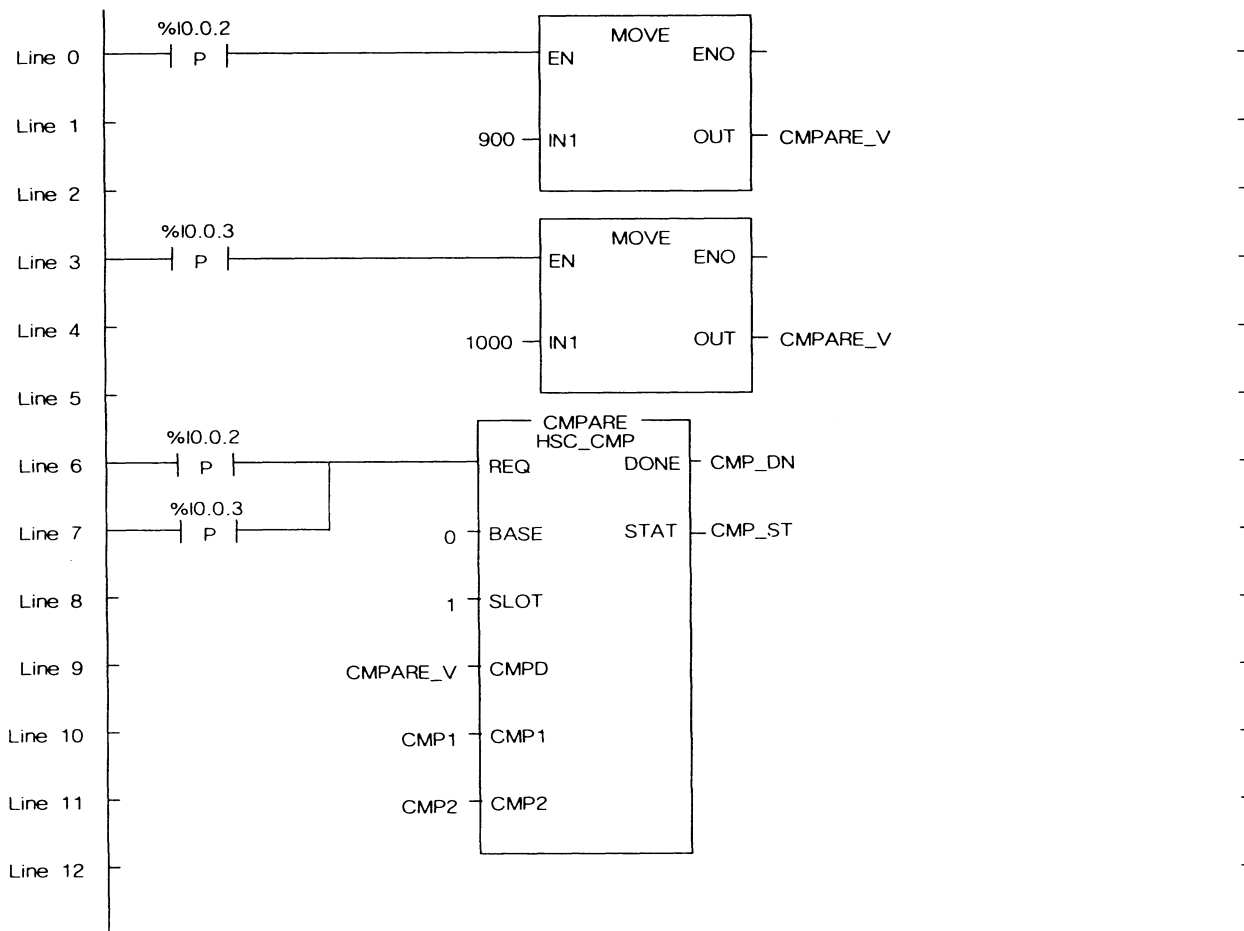


● **Timing diagram**

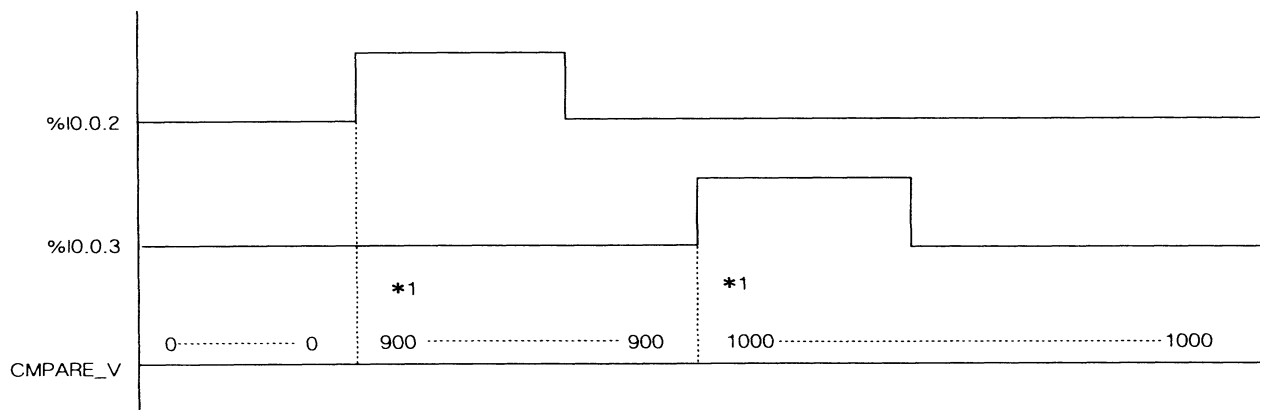


\*The function block HSC\_PRE will be processed for one scan.

### 5.1.3 Setting Comparison Value (CMPD)

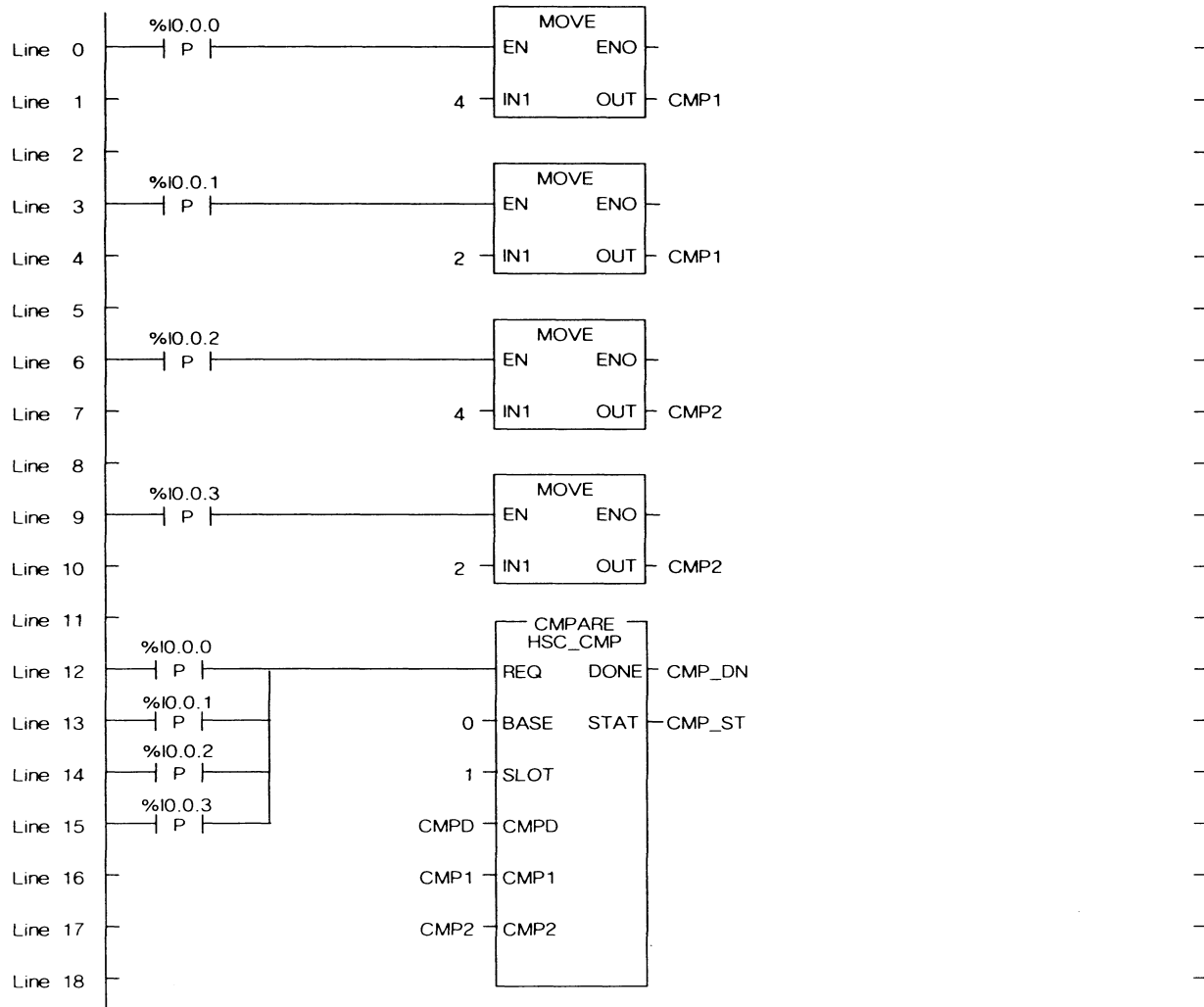


● **Timing Diagram**

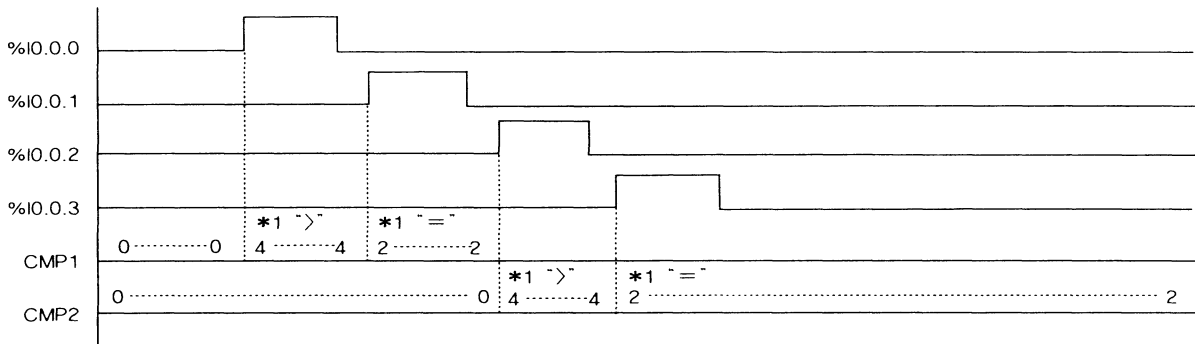


\*1. The function block HSC\_CMP will be processed for one scan.

### 5.1.4 Setting Magnitude Comparison Values (CMP1, CMP2)

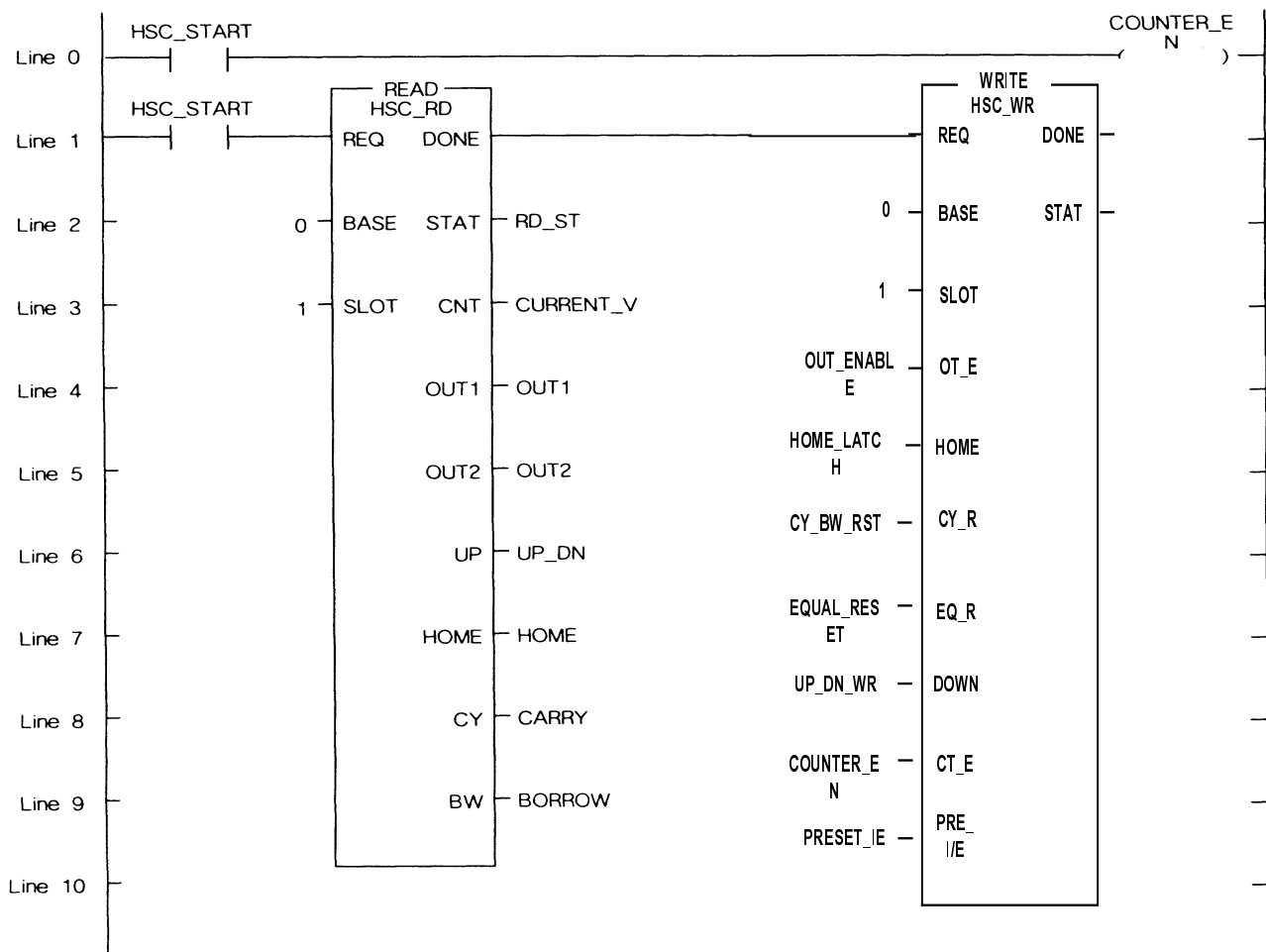


#### ● Timing Diagram

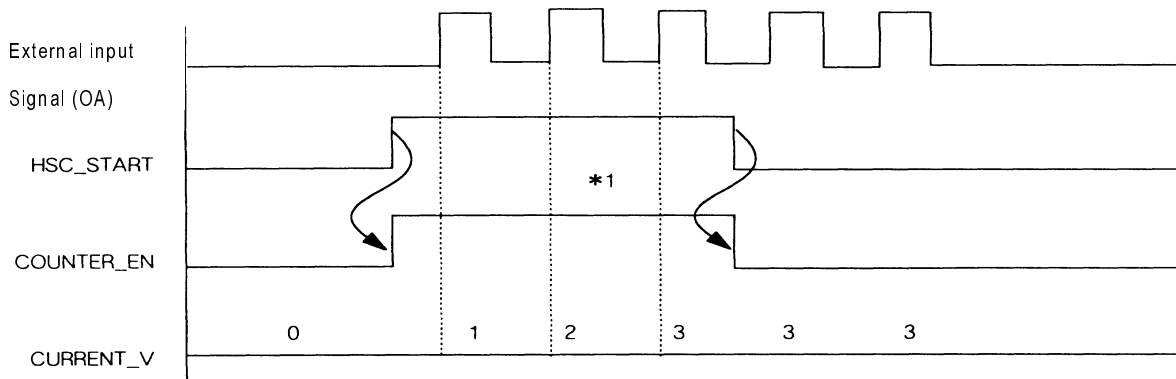


\*1. The function block HSC\_CMP will be processed for one scan.

### 5.1.5 Reading Current Count Value (CNT)

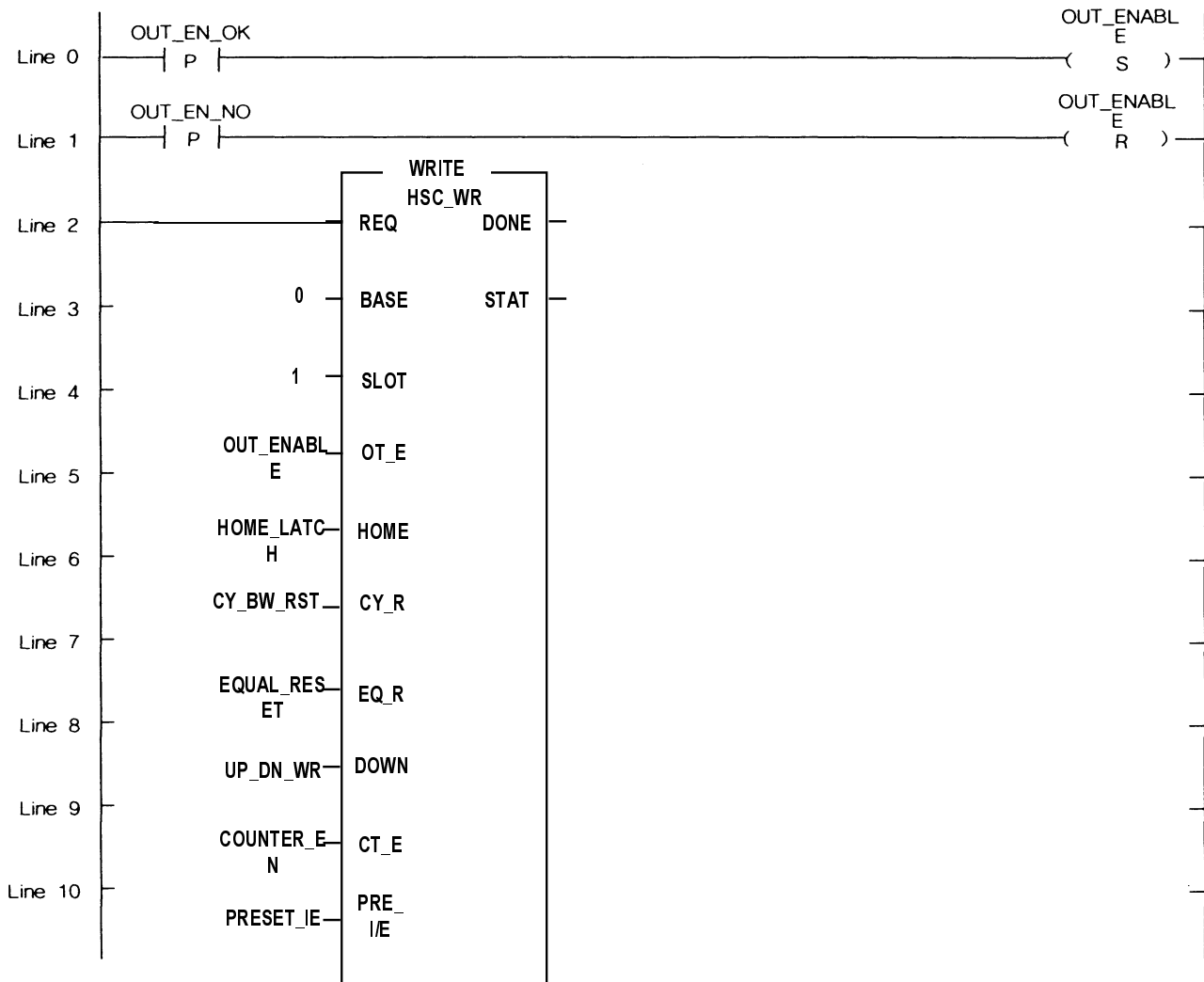


#### ● Timing Diagram

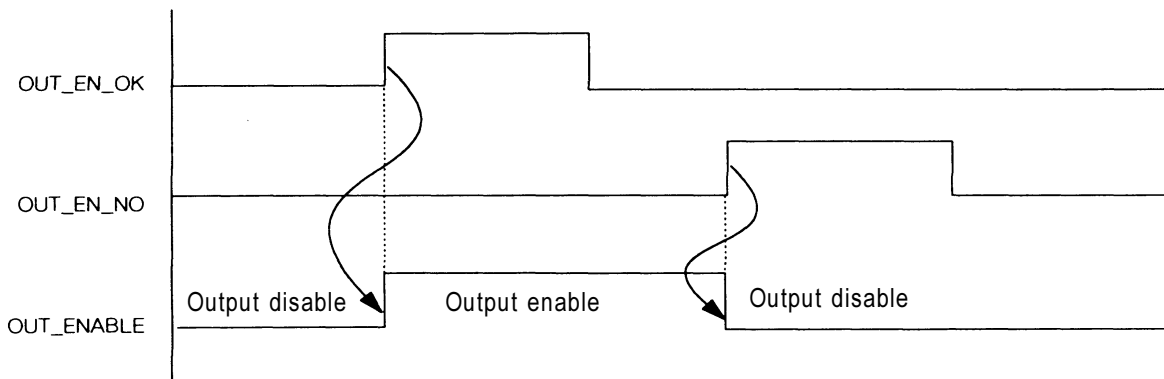


\*1. The current count value (CNT) is read only when the COUNTER\_EN is turned on.

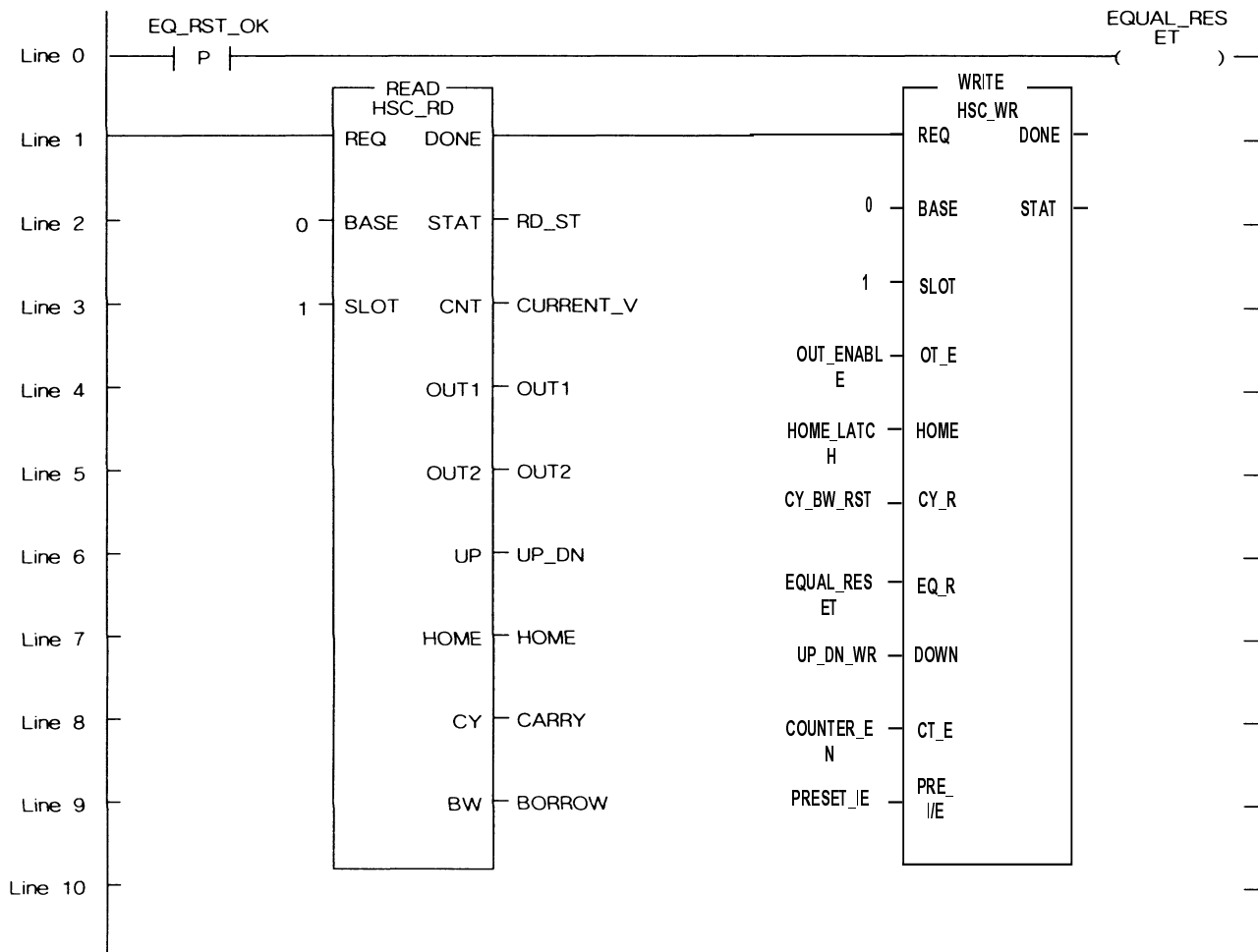
### 5.1.6 Enable Connector Output (OT-E)



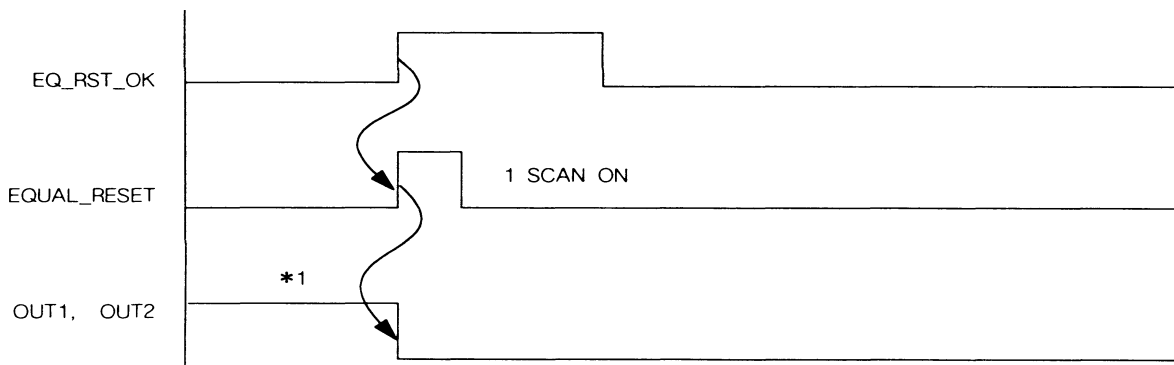
● Timing Diagram



### 5.1.7 Coincidence Reset (EQ-R)

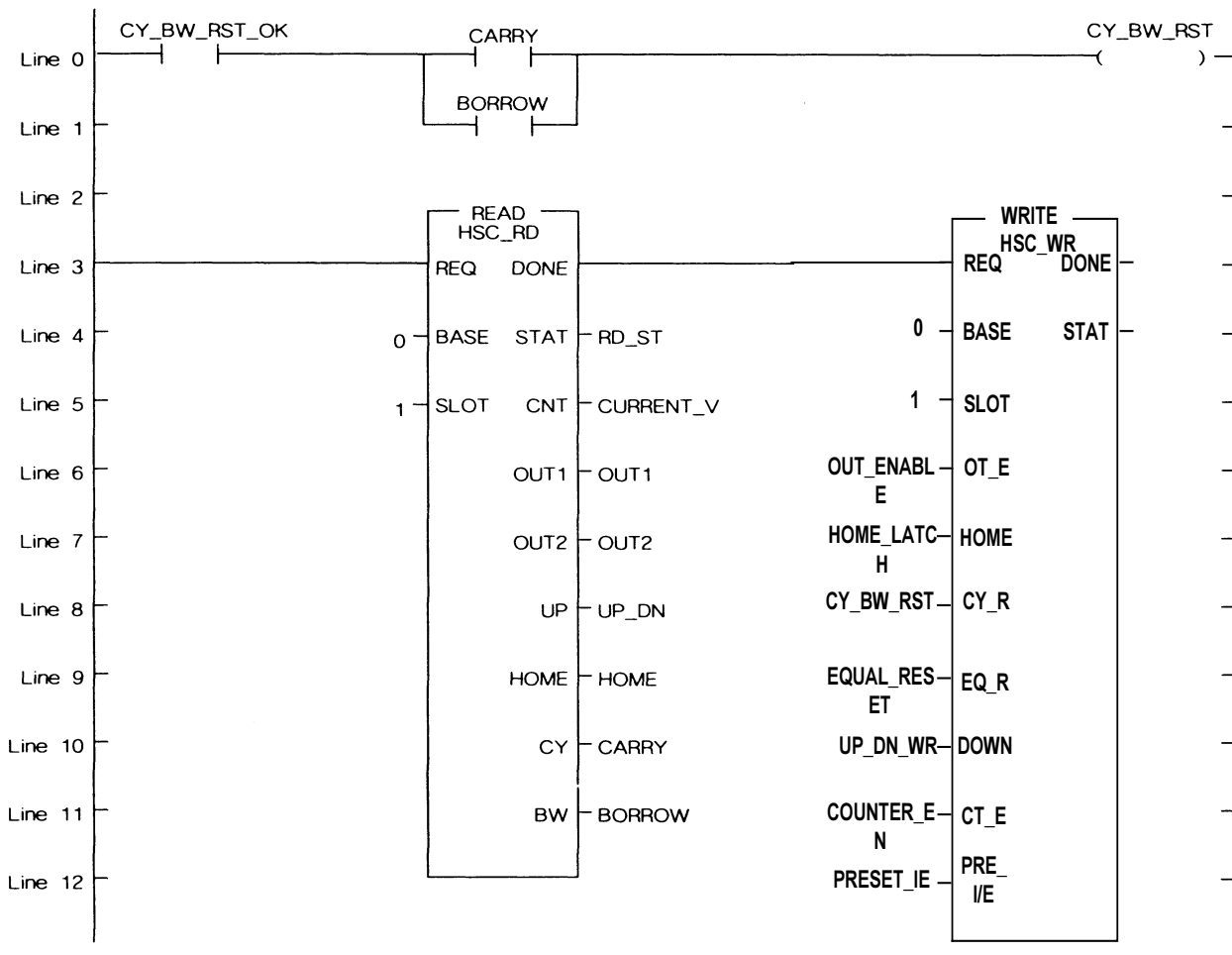


● **Timing Diagram**

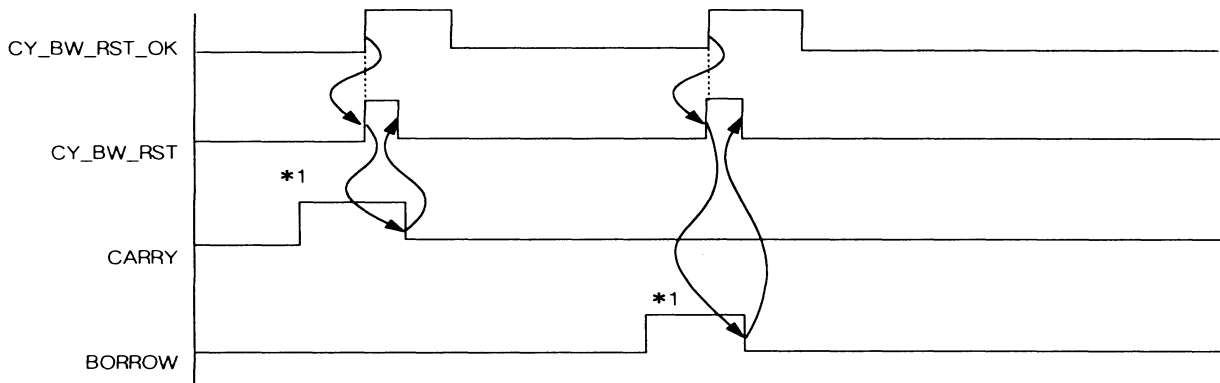


\*1. This occurs only when the comparison values 1 and 2 are set to "=", "≥", or "≤" and the current count value (CNT) equal to the comparison value (CMPD)

### 5.1.8 Carry / Borrow Reset (CY\_R)



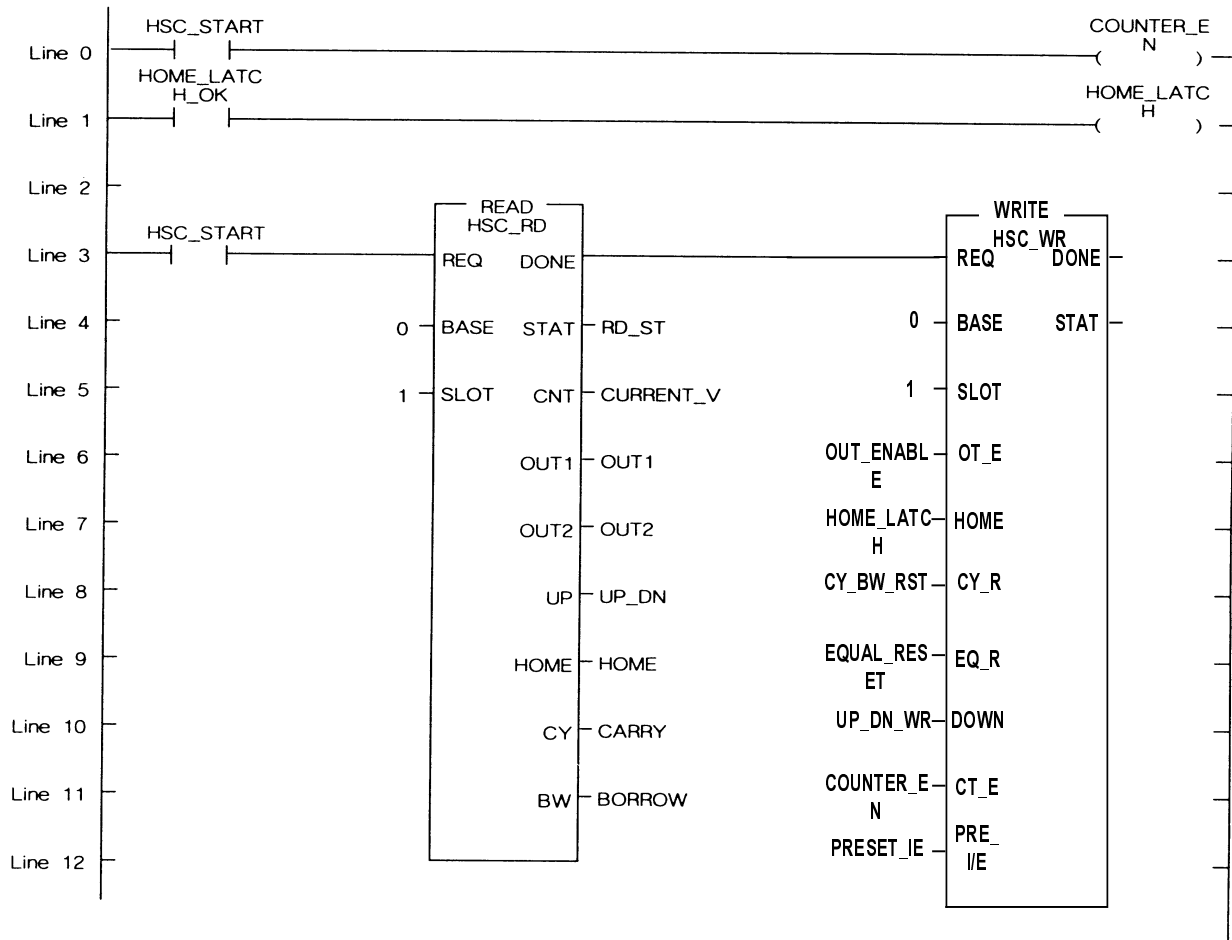
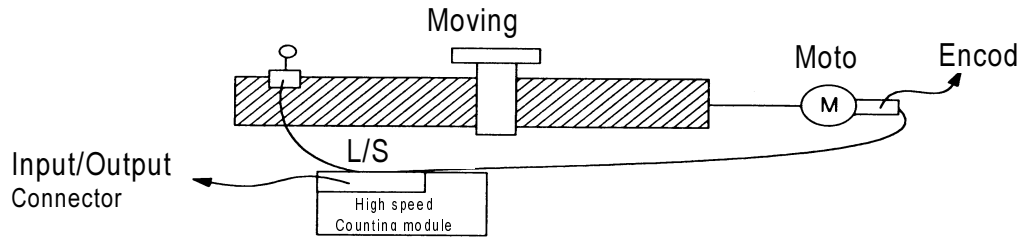
● **Timing Diagram**



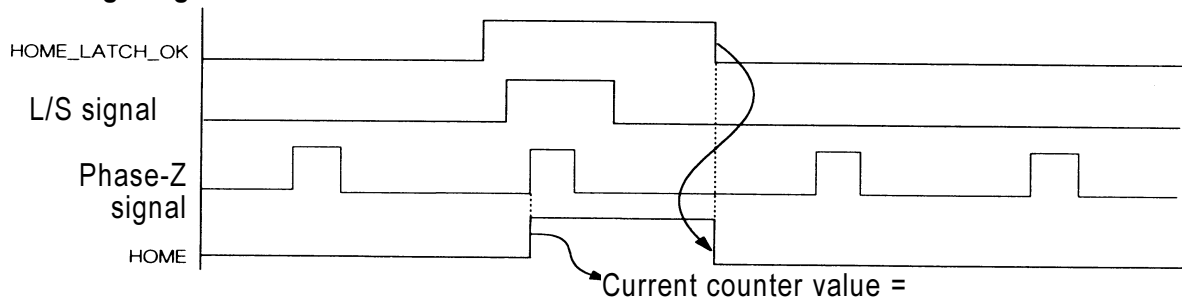
\*1. Carry, Borrow signal occurs when the current count value changes from 16,777,215 to 0 or from 0 to 16,777,215

### 5.1.9 Enabling Home-Latch (HOME)

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



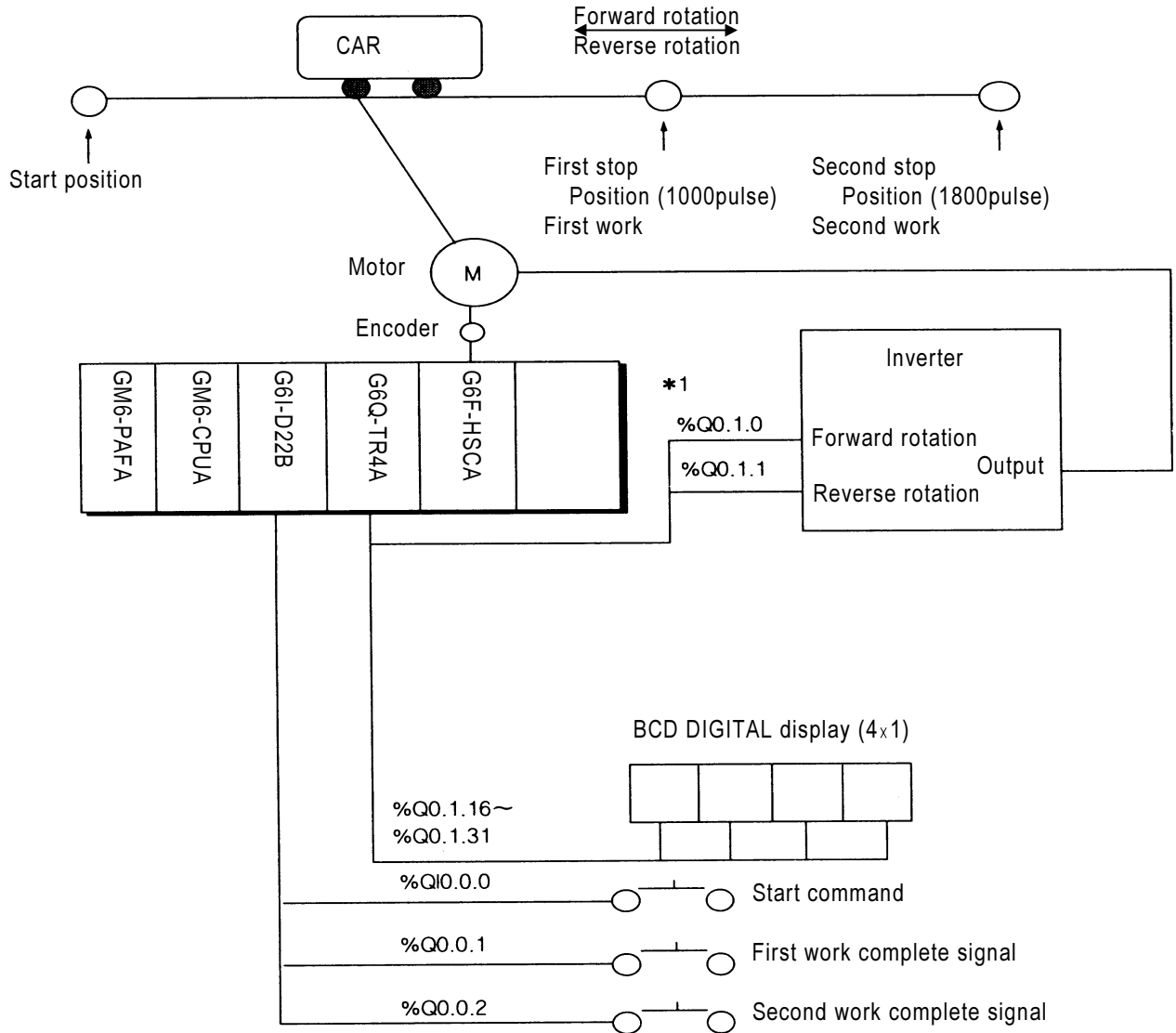
#### ● Timing Diagram



5.2 Application Examples

(1) Program for Moving a Cart by Using the High-Speed Counting Module.

● System Configuration



- GM6-CPUA : GM6 CPU Module
- G6I-D22B : DC Input Module (16 points)
- G6Q-TR4A : TR Output Module (32 points)
- G6F-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

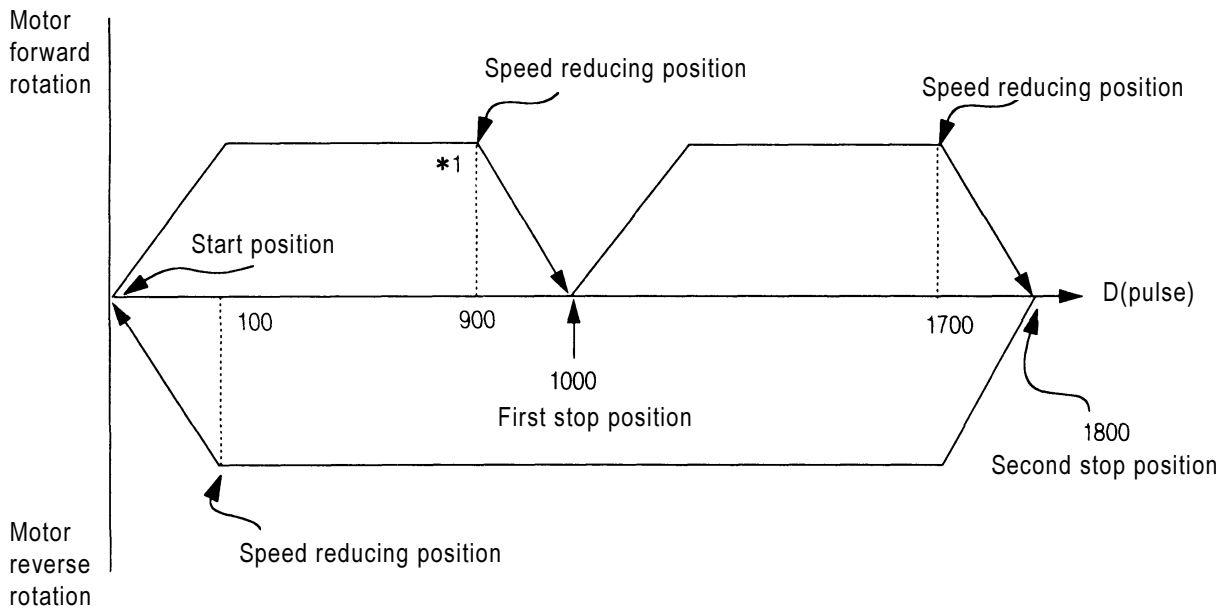
%I0.0.0 : Start Command  
 %I0.0.1 : 1st Work Complete Signal  
 %I0.0.2 : 2nd Work Complete Signal

} 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.

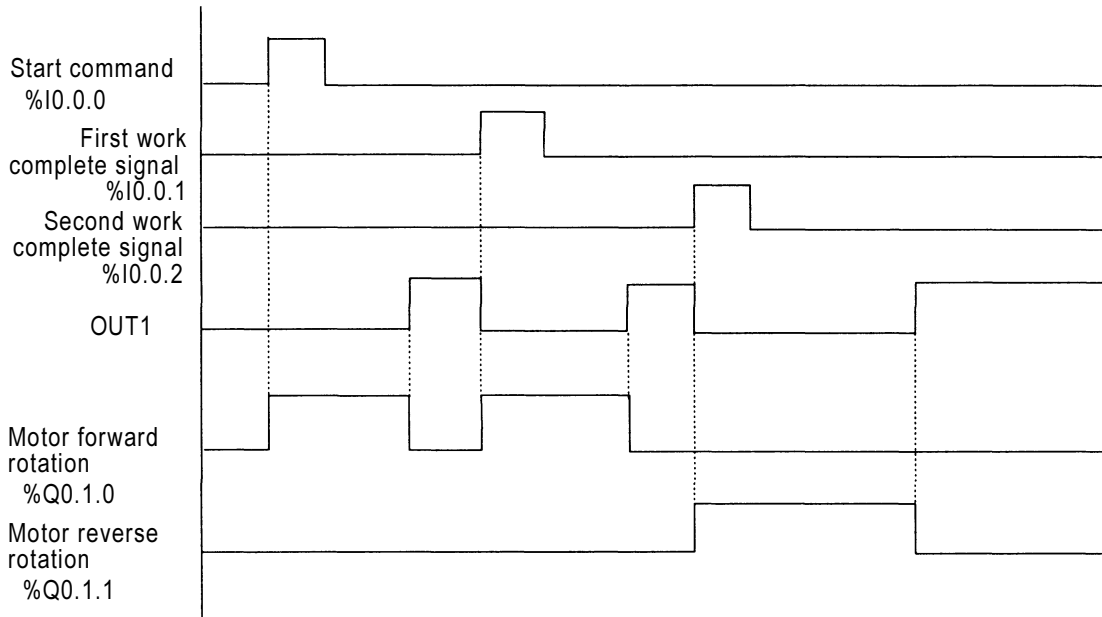
} Output

● Driving mode



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

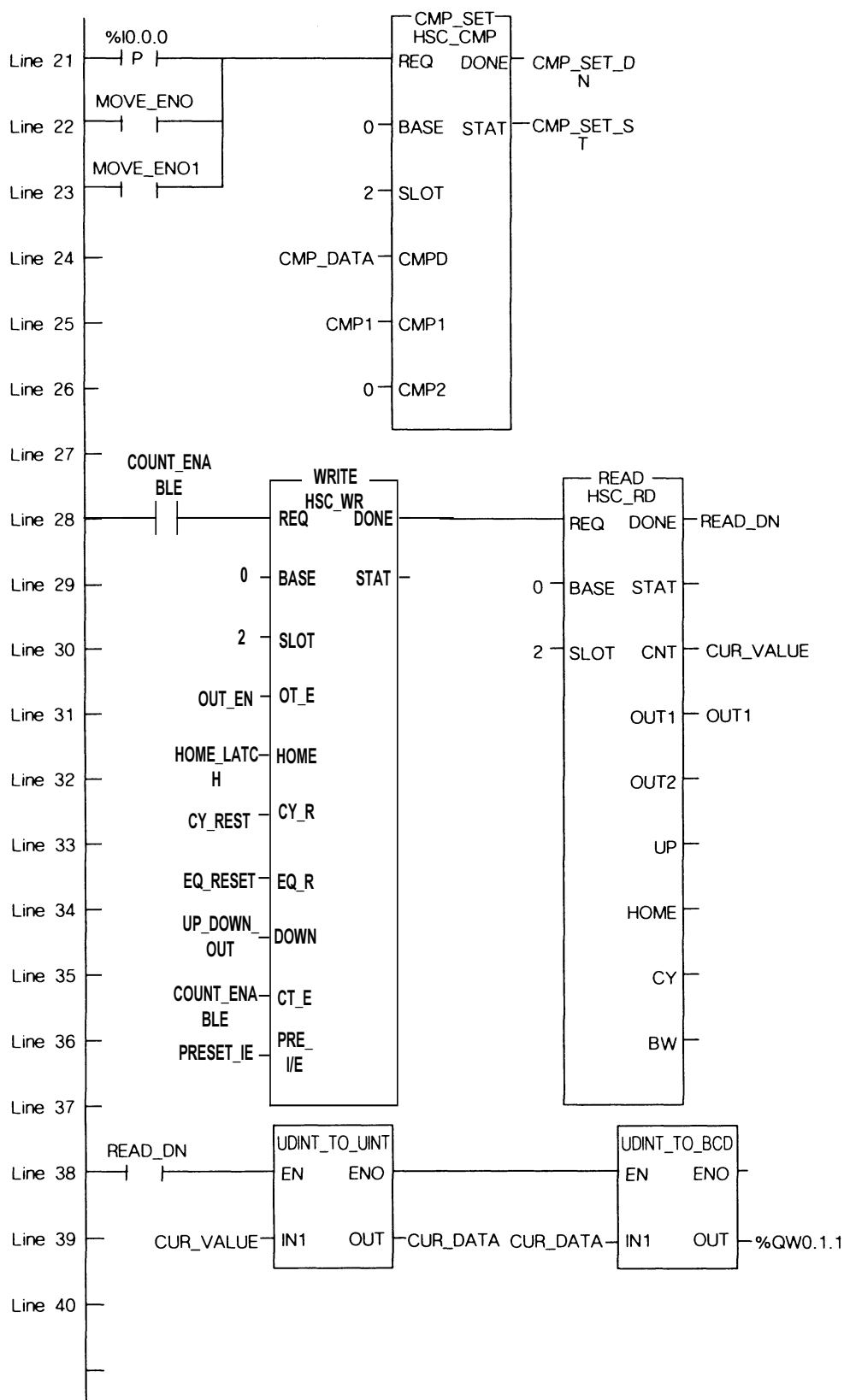
● Operation Timing



● 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	





When first or second works or start command have been finished, CMP\_DATA will be changed.

Write/read are executed whenever COUNT\_ENABLE = ON

The High Speed Counter Module outputs the current count value (CUR\_VALUE) on the BCD digital display.