Chapter 4 Control and Status Blocks

The Delta HMI provides both the command and status blocks for users to run or monitor part of the execution or status of system actions in the DOPSoft. Users can set the control the address of the command and status blocks from [Options]→[Configuration…]→[Control Block].

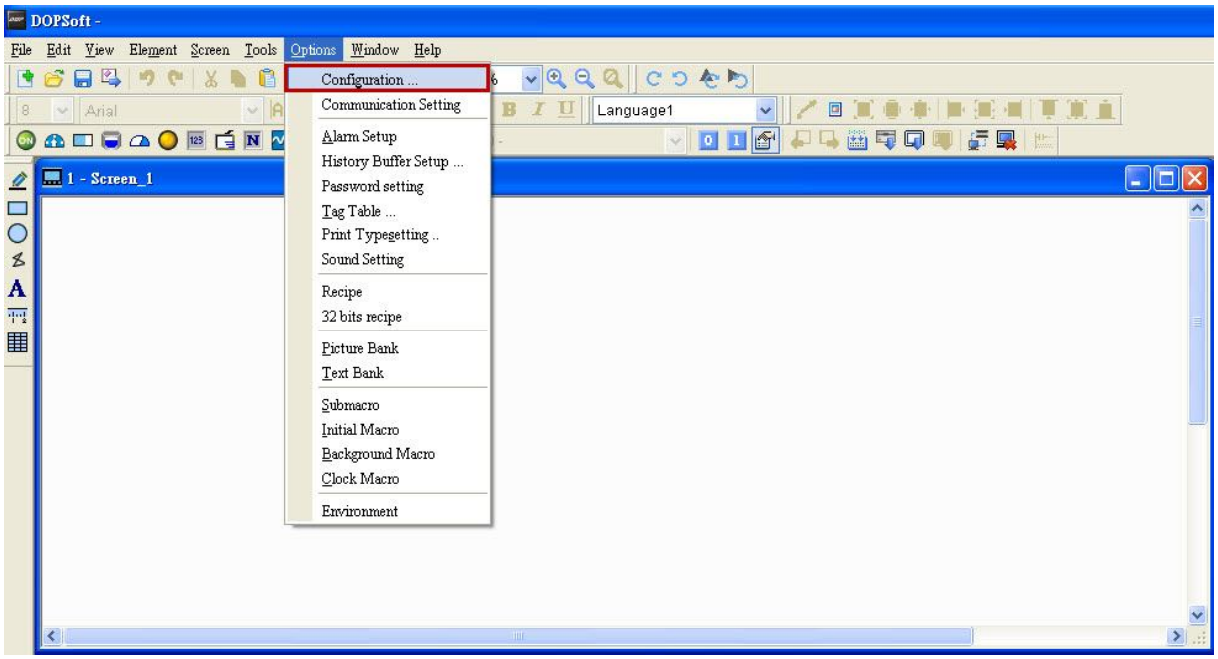


Figure 4-1-1 Configuration

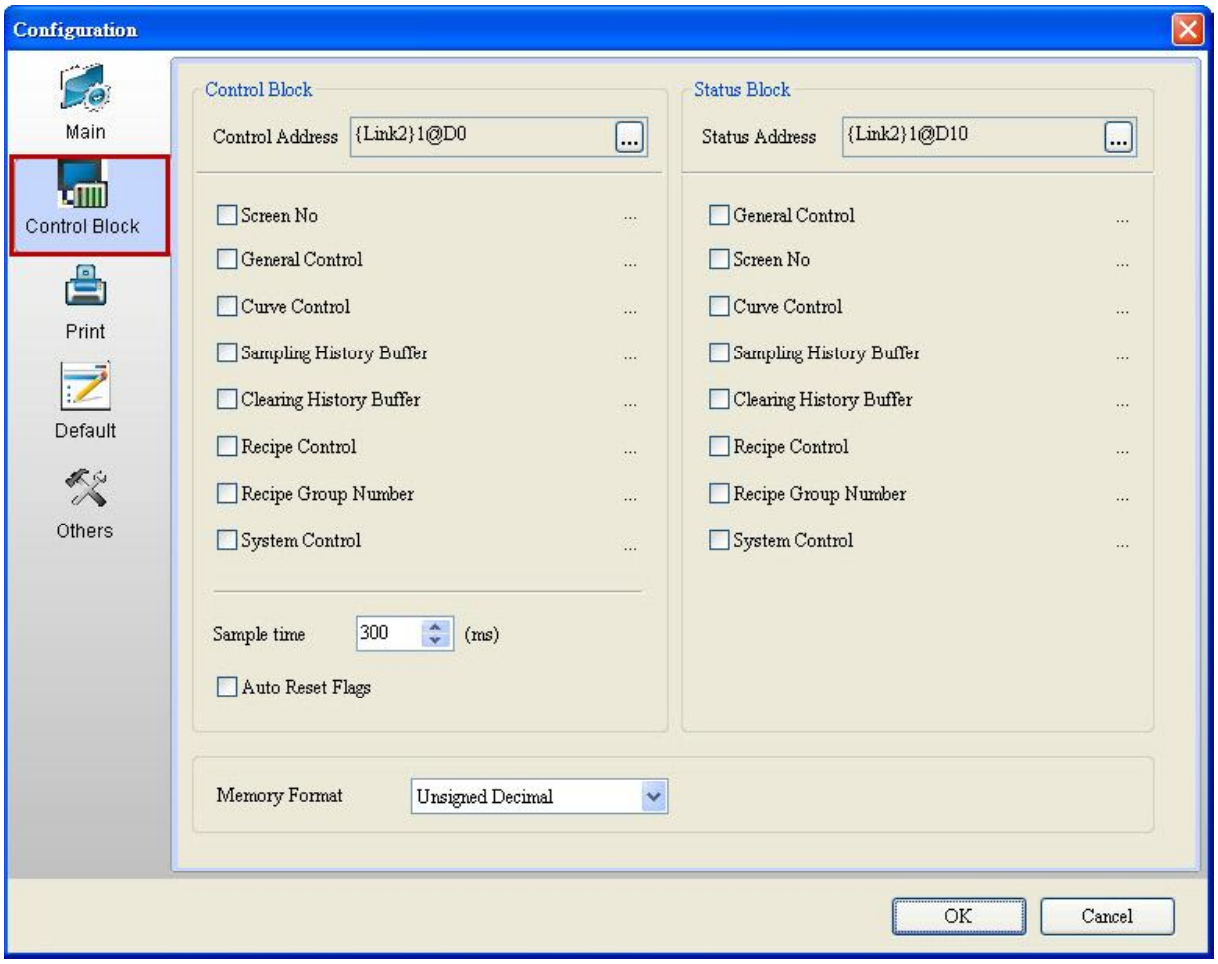


Figure 4-1-2 Control and Status Blocks

With a layout different from that of conventional screen editors, the DOPSoft allows users to customize their control and status blocks by selecting the required features. Take the control block for example, by selecting the [Screen No] and [Recipe Group Number] features, the layout of the control block will be automatically sorted by continuous address and will open and change the applications of the screen and recipe group number features, as shown in Figure 4-1-3.

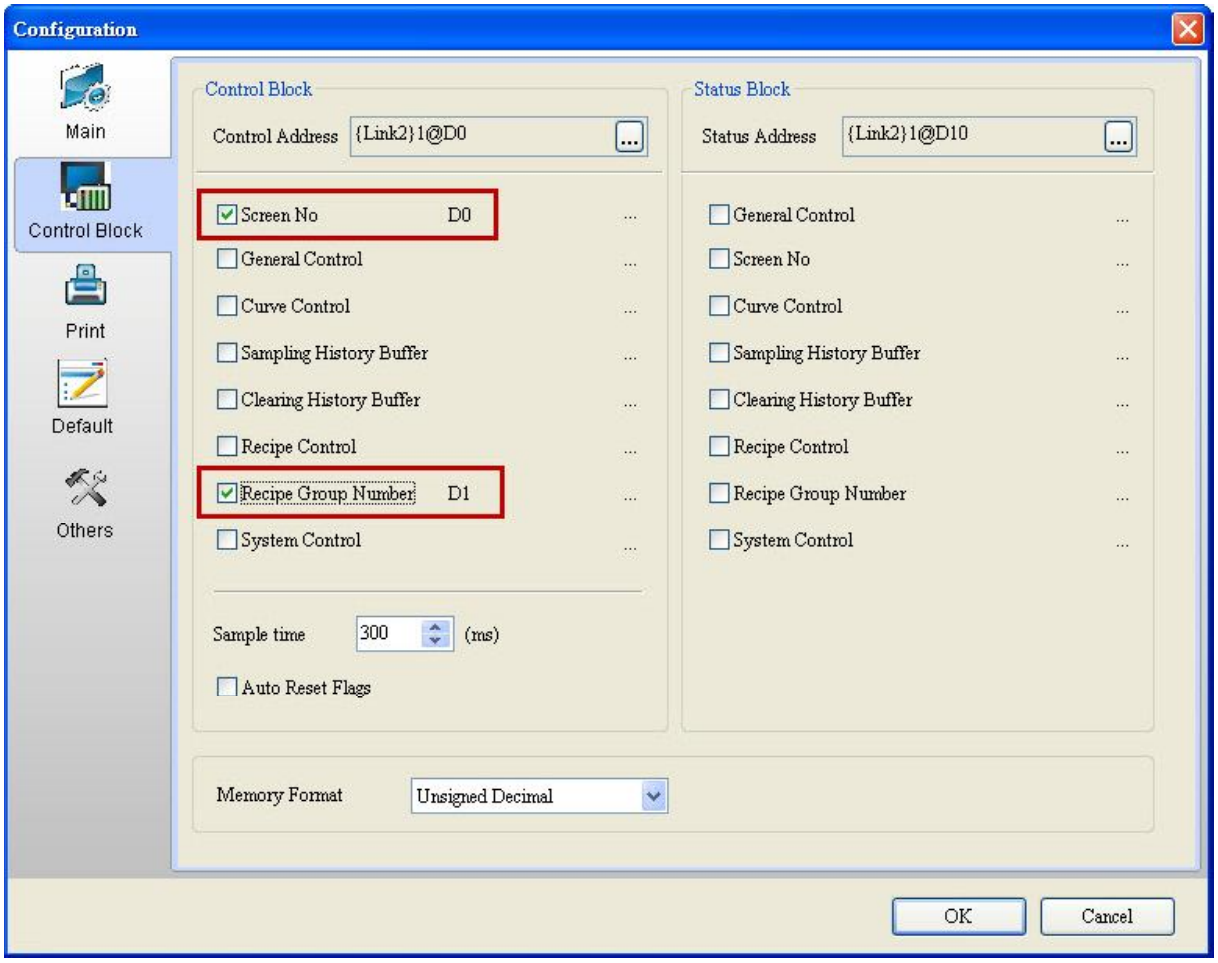


Figure 4-1-3 Description of the control block layout of the DOPSoft

If another feature is selected, such as the [General Control], the address will be sorted in ascending order to form the continuous memory layout as shown in Figure 4-1-4.

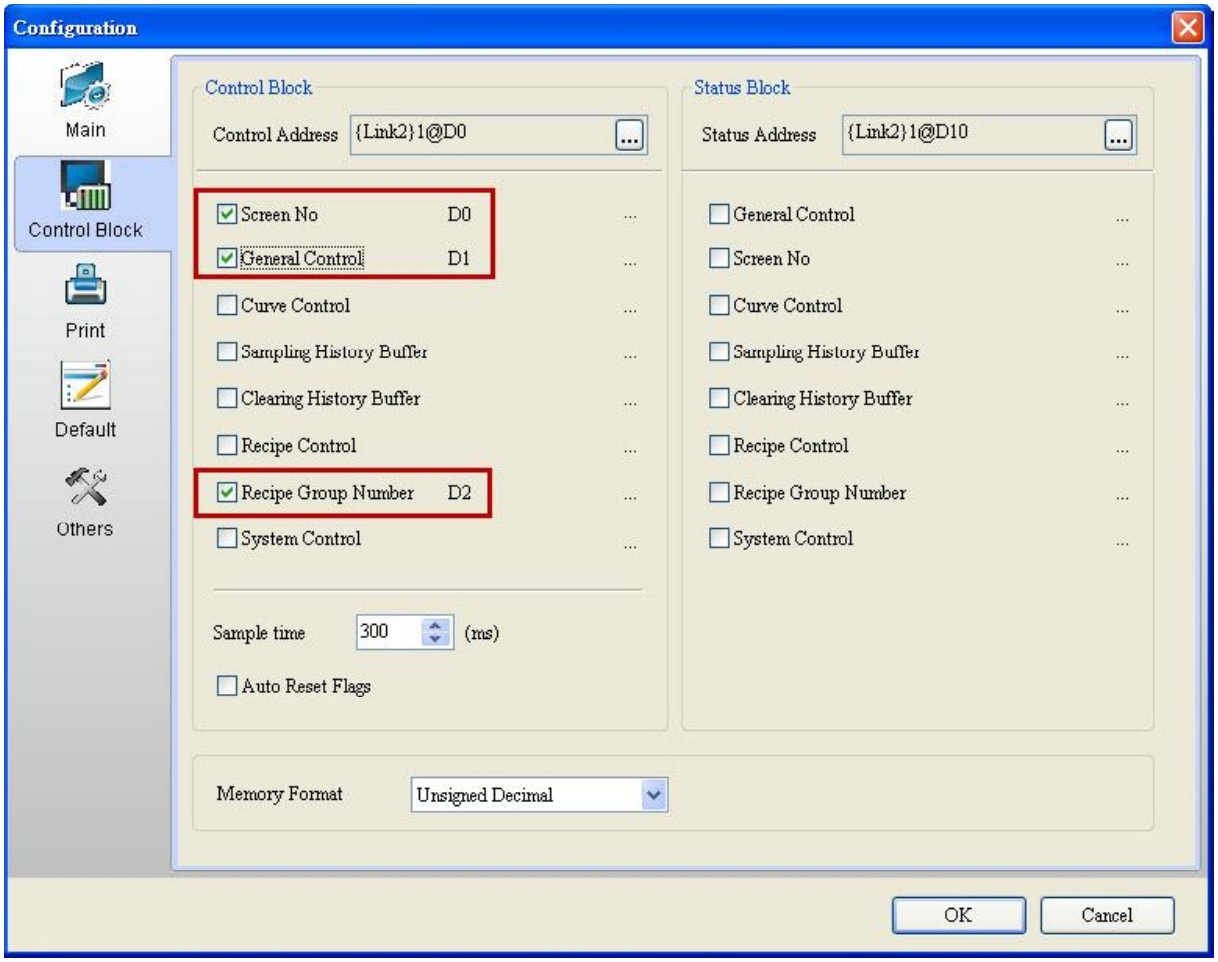


Figure 4-1-4 Description of the control block layout of the DOPSoft.

◆ Sample Time

This feature allows users to flexibly control the sampling time. The default is 300ms. This means the system will take a sample at every 300ms. The sample time range is 200ms-1000ms.

◆ Auto Reset Flags

Users wishing to use the same feature repeatedly in the control block should set the flag of this feature to OFF before re-activate the feature. With the “Auto Reset Flags” function, the HMI can automatically reset flags.

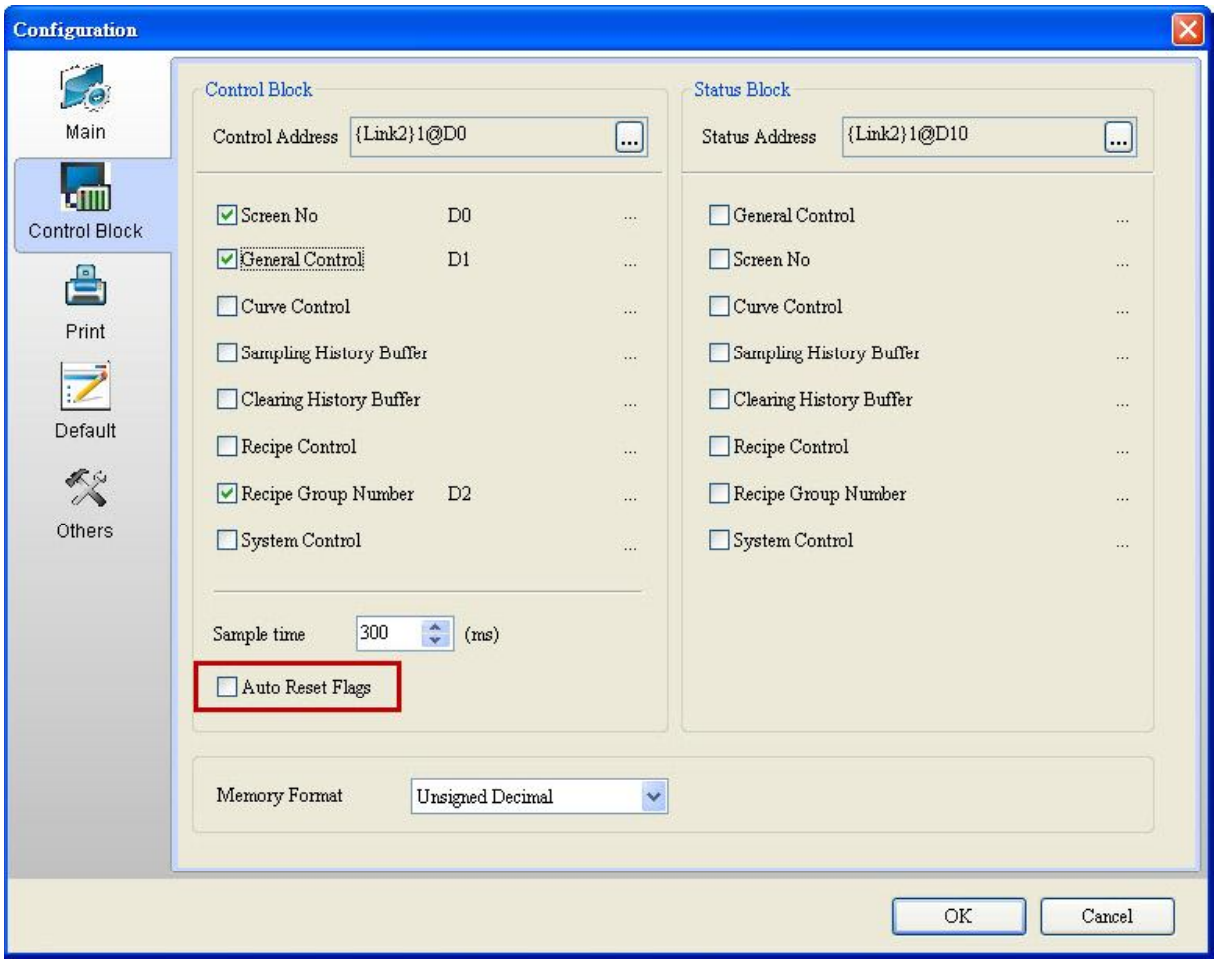


Figure 4-1-5 Auto Reset Flags

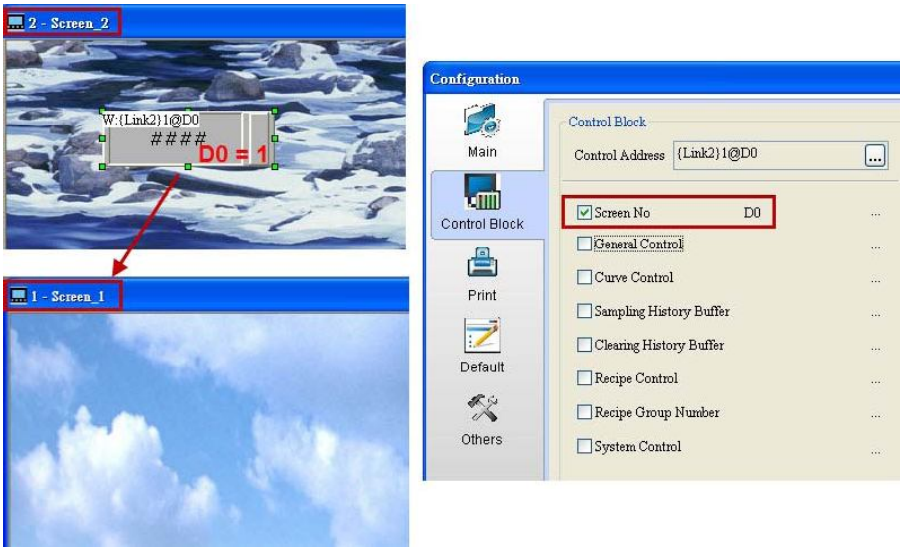
4-1 Control Block

Users can define the controller or the address of registers at a particular section in the control block set by the HMI. This way, users can operate the HMI actions by setting the control block. These actions include screen change, backlight off, user security level setup, sampling or clearing the curve and history buffer, recipe control, multi-language settings, and printing. The control block is a word-based continuous data block.

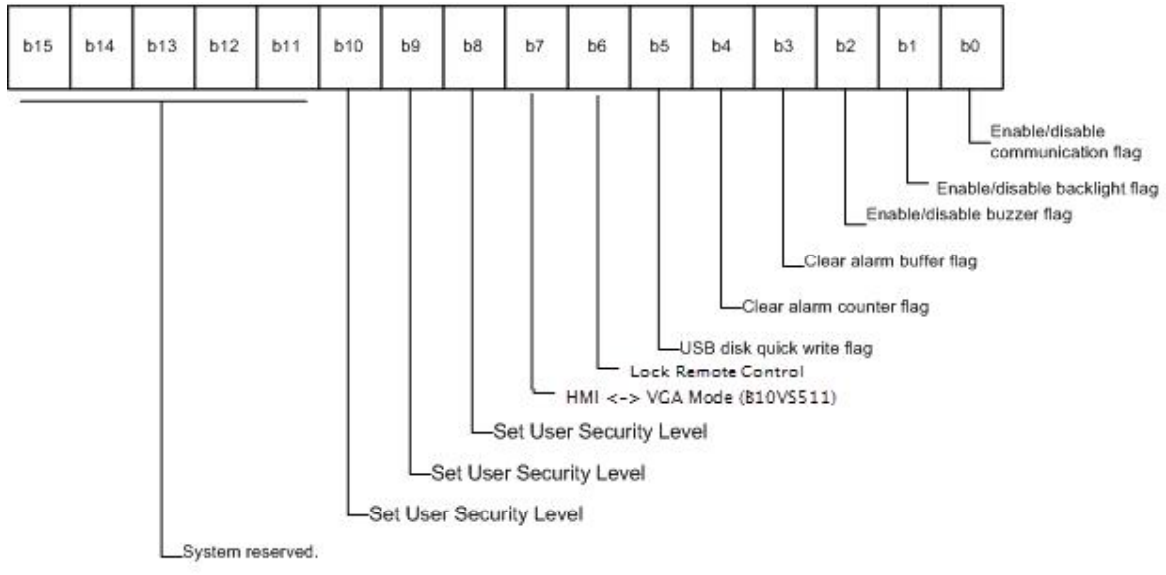
Control Block Register	Controller Register		Internal Memory	
	Register (D)	Demo Address	Register ($)	Demo Address
Screen No.	**D**n	**D**0	**$**n	**$**15
General Control	**D**n+1	**D**1	**$**n+1	**$**16
Curve Control	**D**n+2	**D**2	**$**n+2	**$**17
Sampling History Buffer	**D**n+3	**D**3	**$**n+3	**$**18
Clearing History Buffer	**D**n+4	**D**4	**$**n+4	**$**19
Recipe Control	**D**n+5	**D**5	**$**n+5	**$**20
Recipe Group Number	**D**n+6	**D**6	**$**n+6	**$**21
System Control Flag	**D**n+7	**D**7	**$**n+7	**$**22

Table 4-1-1 Control Block Register Type

◆ Screen Number Register

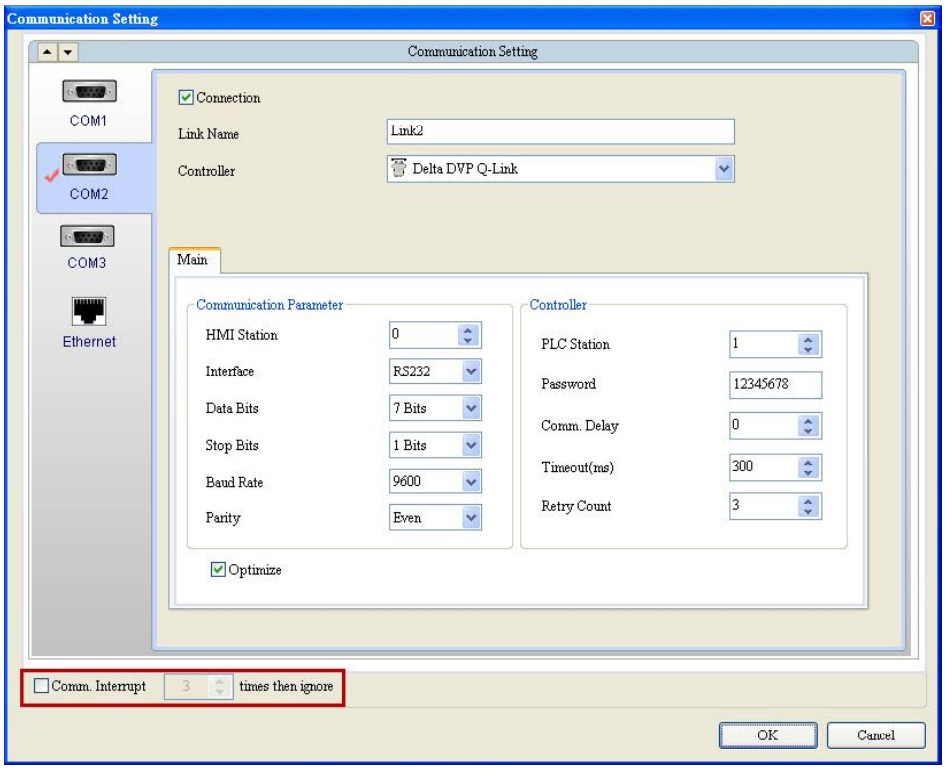
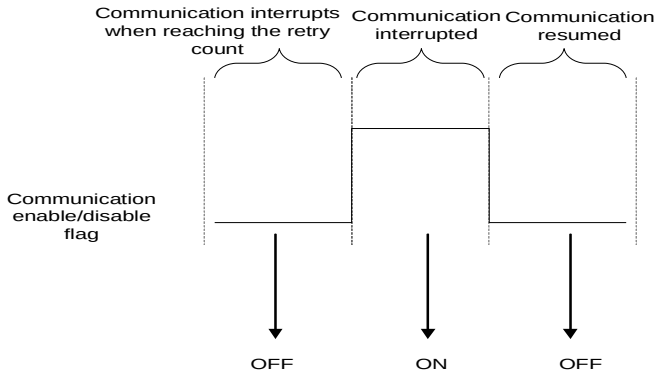
Screen Number Register Table 4-1-2 Control Block Screen Number Register	
Screen Nos. b0 to b15.	➢ Write the designated screen number to the register, and the HMI will immediately jump to that screen. ➢ As shown in the following example, by inputting the device number “D0” and the value “1” (D0=1), the HMI will jump to page 1. 

◆ Control Block—General Control Registers

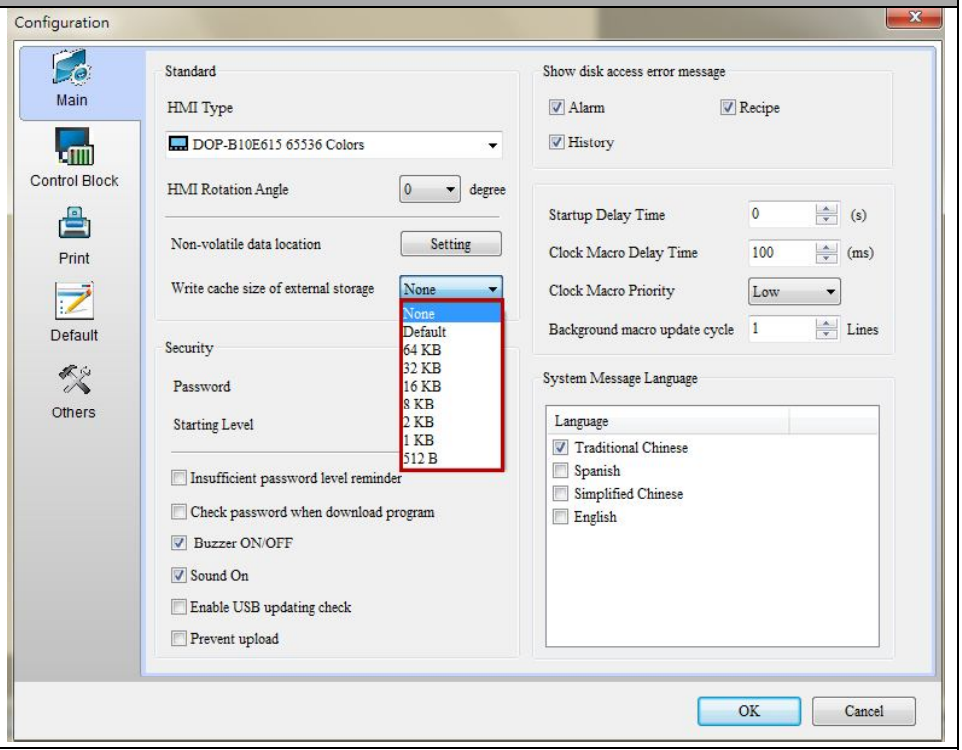
General Control Registers Table 4-1-3 Control Block—General Control Registers


General Control Registers

Table 4-1-3 Control Block—General Control Registers

b0: Enable/disable communication	➢ Enables/disables the communication of the HMI. When using the enable/disable flag of this communication, users should select “Comm. Interrupt XXX times then ignore” and input the retry count from [Options]→[Communication Setting].  ➢ In the communication between the HMI and the controller, when the communication reaches the set retry count, the HMI will interrupt the communication with the controller and set the flag to ON. At the same time, the communication will be interrupted and the communication error message box will not pop up (the communication between the HMI and other controllers will not be affected). Users can reset this flag to reactivate the communication between the HMI and the controller.  ➢ This flag can only be used to resume communication after it is interrupted automatically and cannot be used to set the flag to ON

General Control Registers Table 4-1-3 Control Block—General Control Registers	
	to directly interrupt the communication between the HMI and controller. If it is necessary to manually disable or enable the communication between the HMI and controller, run the STATIONON/STATIONOFF macro commands. ➢ This flag is not applicable to “Auto Reset Flags”.
b1 - Enable/disable backlight	➢ Enables/disables HMI backlight. When the flag is ON, the HMI backlight is disabled. When the flag is OFF, the HMI backlight is enabled. ➢ This flag is not applicable to “Auto Reset Flags”.
b2 – Enable/disable buzzer	➢ Enables/disables HMI buzzer. When the flag is ON, the HMI buzzer is disabled. When the flag is OFF, the HMI buzzer is enabled. ➢ This flag is not applicable to “Auto Reset Flags”.
b3 – Clear alarm buffer	➢ Clears data in the HMI alarm buffer. If the flag is ON, the data in the alarm buffer will be cleared. Users must set the flag to OFF to reactive buffer before reusing it.
b4 – Clear alarm counter	➢ Clears data in the HMI alarm counter. If the flag is ON, the data in the alarm counter will be cleared. Users must set the flag to OFF to reactive buffer before reusing it.
b5 – USB Disk Quick Write	To quickly update data in the HMI cache to the USB disk. If the alarm, history or recipe is activated, and the USB disk is held, the HMI will update the cache data to the USB disk concurrently. Users must set the flag to OFF to reactive buffer before reusing it. ➢ The HMI will first store in the cache the data written to the USB disk. When the data do not each the default volume (as shown in the figure below), data in the cache will not be written to the USB disk, in order to prevent USB disk damage as a result of continuous writing. Part of the data will be lost when the data volume is smaller than the buffer capacity or there is an unexpected power interruption. To prevent this, users can force the system to activate this flag to write data to the USB disk to maintain data existence.

General Control Registers Table 4-1-3 Control Block—General Control Registers	
	
b6 – Lock Remote Control	➢ Enable/disble control can be operated eRemote. When the flag is ON, the eRemote could not be operated. When the flag is OFF, the eRemote could be operated. ➢ This flag is not applicable to “Auto Reset Flags”.
b7 – HMI <-> VGA Mode (B10VS511)	➢ This bit is only for DOP-B10VS511. ➢ When users trigger this bit in B10VS511, it could switch HMI to VGA mode. After into VGA mode, users just connect DMV with B10VS511 to use DMV. ➢ This flag is not applicable to “Auto Reset Flags”.

General Control Registers

Table 4-1-3 Control Block—General Control Registers

b8, b9, b10 – Set User Security Level

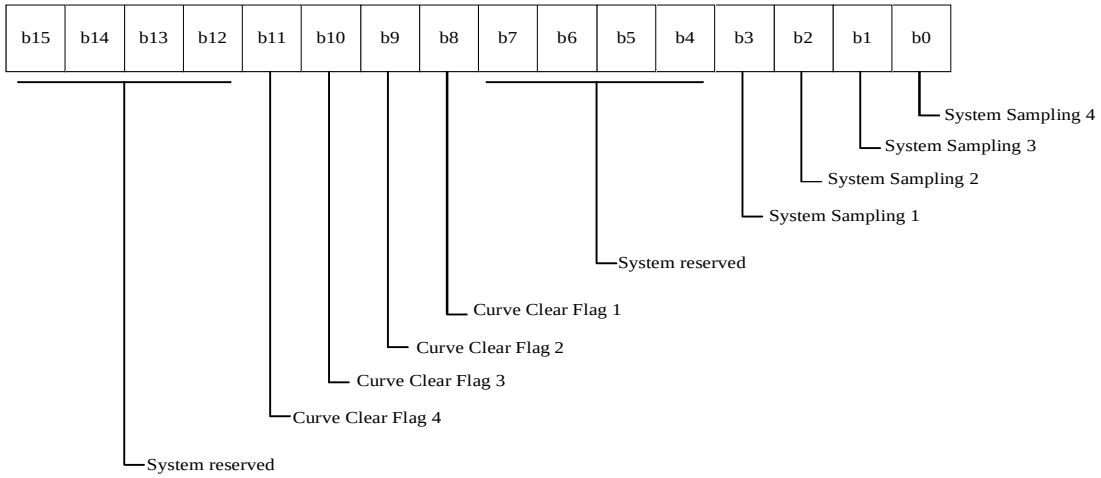
- Users can change the present security level of HMI users by activating the flag of Bits 8-10 provided by general control registers. The internal security level of the HMI includes:
  (1) Privilege 0-7: From the lowest to the highest;
  (2) Supreme Privilege: No need of control by these three flags.
- Users can set privilege 0-7 with these three flags as shown below:

Security Level	Flag Control		
	Bit 10	Bit 9	Bit 8
Security Level 0	0	0	0
Security Level 1	0	0	1
Security Level 2	0	1	0
Security Level 3	0	1	1
Security Level 4	1	0	0
Security Level 5	1	0	1
Security Level 6	1	1	0
Security Level 7	1	1	1

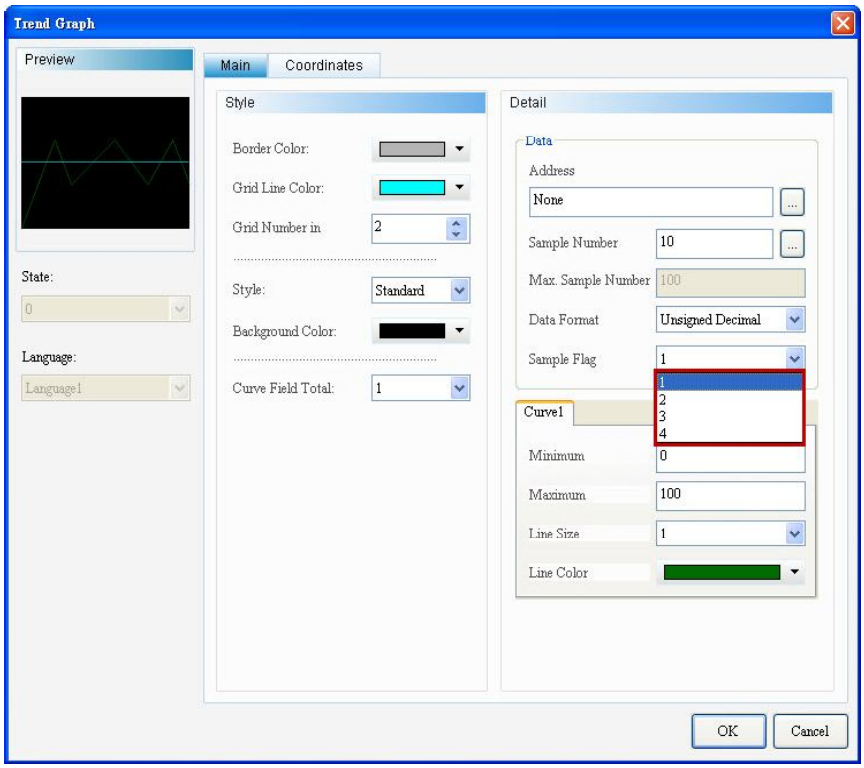
◆ Curve Control Register

Curve Control Register

Table 4-1-4 Control Block—Curve Control Register

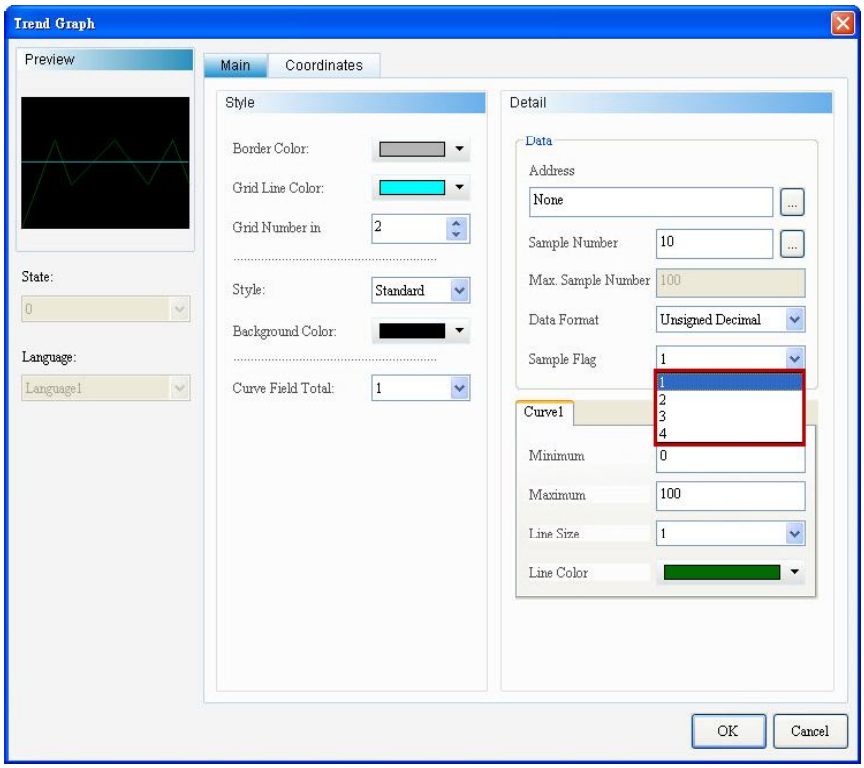


b0 ~ b3 – Curve Sampling Flags (1 ~ 4)	➢ The DOPSoft provides four curve sampling flags. Curves include the general curve and X-Y curve. The curve drawing action is controlled by the curve sampling flags. ➢ If these flags are ON, the corresponding curve elements will sample and draw the curve on the elements. Turn these flags OFF and reactivate them to use this function repeatedly. ➢ The sampling flag 1 of the curve element should correspond to the curve sampling flag 1, sampling flag 2 of the curve element to the curve sampling flag 2, etc.

Curve Control Register Table 4-1-4 Control Block—Curve Control Register	
	
b8 ~ b11 – Curve Clearing Flags (1 ~ 4)	➢ The DOPSoft provides four curve clearing flags. Curves include the general curve and X-Y curve. The curve clearing action is controlled by the curve sampling flags. ➢ If these flags are ON, the corresponding curve elements will clear the curve on the elements. Turn these flags OFF and reactivate them to use this function repeatedly. ➢ The sampling flag 1 of the curve element should correspond to the curve clearing flag 1, sampling flag 2 of the curve element to the curve clearing flag 2, etc.

Curve Control Register

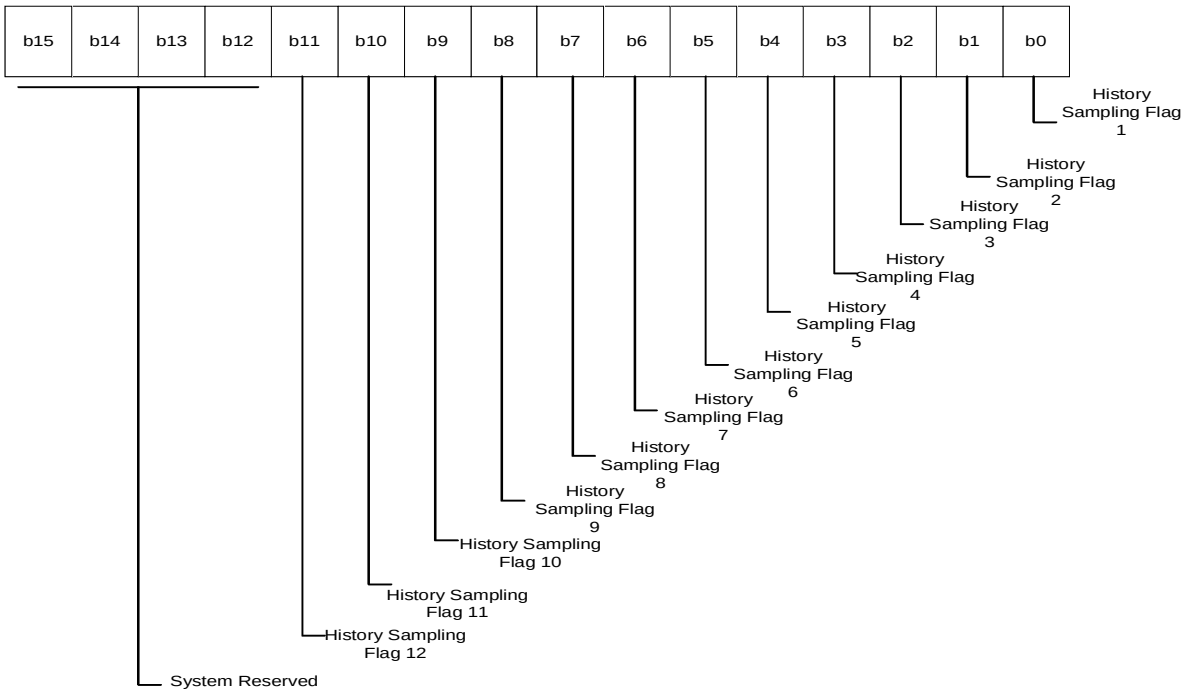
Table 4-1-4 Control Block—Curve Control Register



◆ History Sampling Register

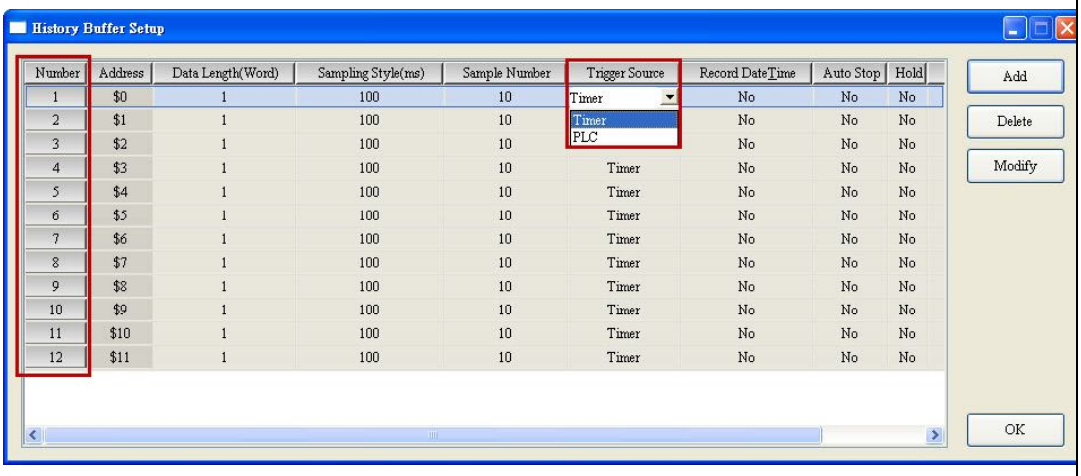
History Sampling Register

Table 4-1-5 Control Block—History Control Register



b0 ~ b11 – History Sampling Flags (1~12)

➢ It can record up to 12 sets of history data, and each set of history data corresponds to a history sampling flag. History can be activated by the [Timer] or [PLC]; i.e. it is activated by the history sampling flag.

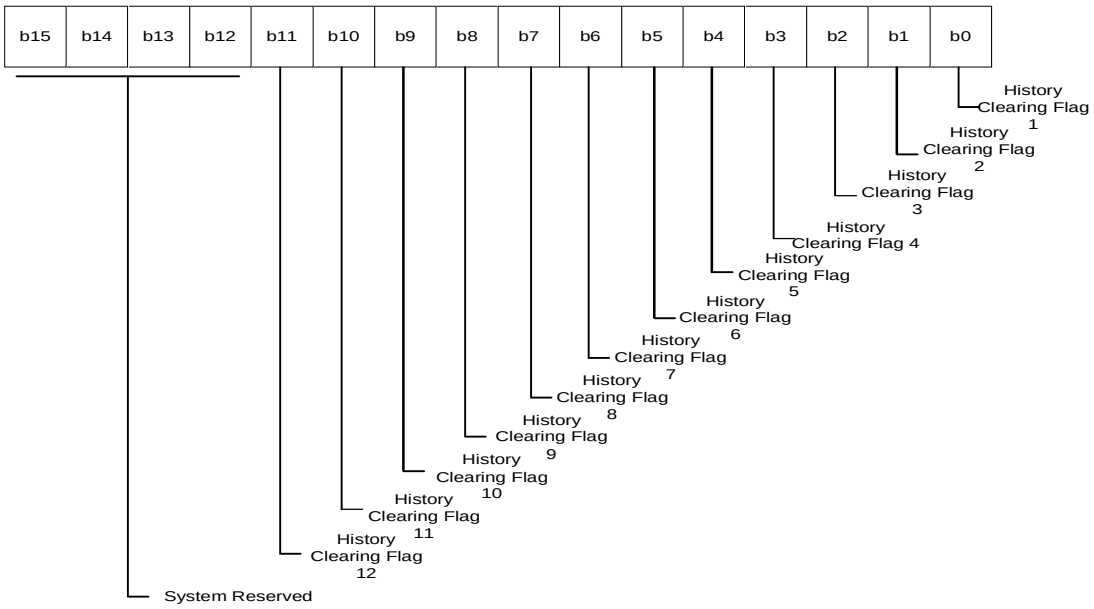


➢ Users can determine the sampling time by activating the history sampling flag. When the history sampling flag is ON, data are sampled once. Turn these flags off and reactivate them to use this function repeatedly.

◆ History Clearing Register

History Clearing Register

Table 4-1-6 Control Block-- History Clearing Register

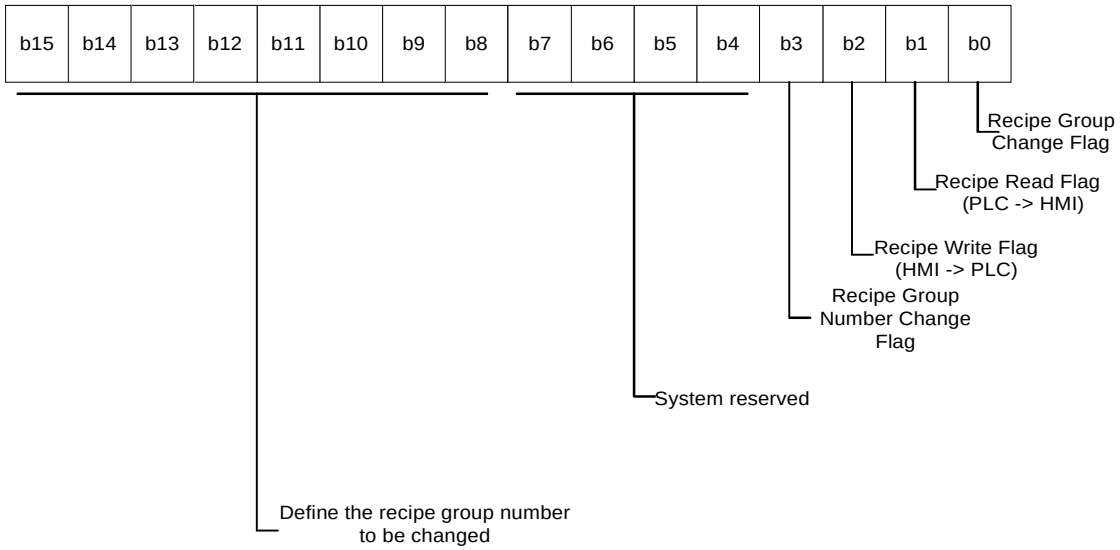


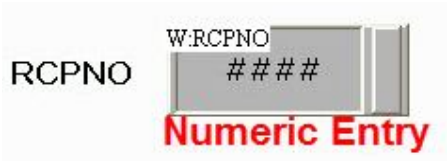
b0 ~ b11 – History Clearing Flags (1~12)	➢ Users can clear history data by activating the history clearing flag. When the history clearing flag is ON, history data are cleared. Turn these flags off and reactivate them to use this function repeatedly.

◆ Recipe Control Register

Recipe Control Register

Table 4-1-7 Control Block-- Recipe Control Register



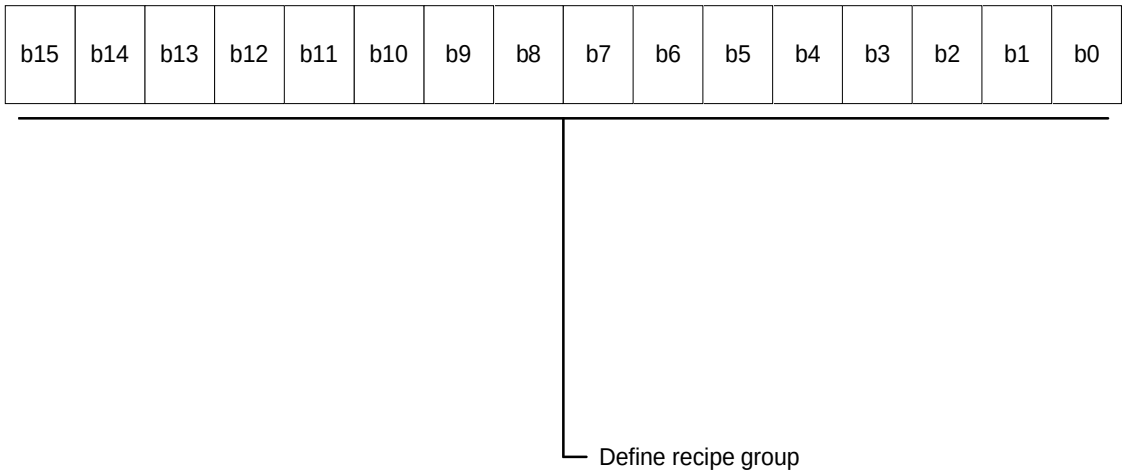
b0 – Recipe Group Number Change Flag	➢ For use on 16-bit recipes. ➢ Users can call or change a recipe group in two ways: (1) Change directly from the RCPNO of the HMI's internal register.  Value Input Element (2) Change with the recipe group change flag. ➢ Users wishing to change the HMI's recipe group number with this flag should write in the group control register (Table 4-1-18 Recipe Control Register) the recipe group to be changed before activating the recipe group change flag. ➢ When the recipe group change number flag is ON, the recipe group number will be change according to the number defined in the recipe group control register. Also, the RCPNO number in the internal register will be changed automatically. Turn the flag off and reactivate it to use this function repeatedly.
b1 – Recipe Read Flag (PLC →HMI)	➢ When the recipe read flag is ON, the HMI will read the recipe data in the controller and write in the recipe data register assigned. Turn the flag off and reactivate it to use this function

Recipe Control Register Table 4-1-7 Control Block-- Recipe Control Register	
	repeatedly.
b2 – Recipe Write Flag (HMI → PLC)	➢ When the recipe write flag is ON, the HMI will write the selected data in toe controller register. Turn the flag off and reactivate it to use this function repeatedly.
b3 – Recipe Group Change Flag	➢ For use on 32-bit recipes. ➢ Users can call or change a recipe group in two ways: (1) Change directly from the RCPG of the HMI's internal register.  Value Input Element (2) Change with the recipe group change flag. ➢ When the recipe group change flag is ON, the recipe group number will be change according to the number defined in the recipe group control register (b8 ~ b15). Also, the RCPG number in the internal register will be changed automatically. Turn the flag off and reactivate it to use this function repeatedly.
b8 ~ b15 – Define the number of the recipe groups to be changed	➢ Users can define the number of the recipe groups to be changed with the high bit groups Bits 8-15 from the recipe group control register. By activating the RCPG change flag, the HMI will change the number of the RCPG in the internal register, thus changing the recipe group.

◆ Recipe Group Control Register

Recipe Group Control Register

Table 4-1-8 Control Block-- Recipe Group Control Register

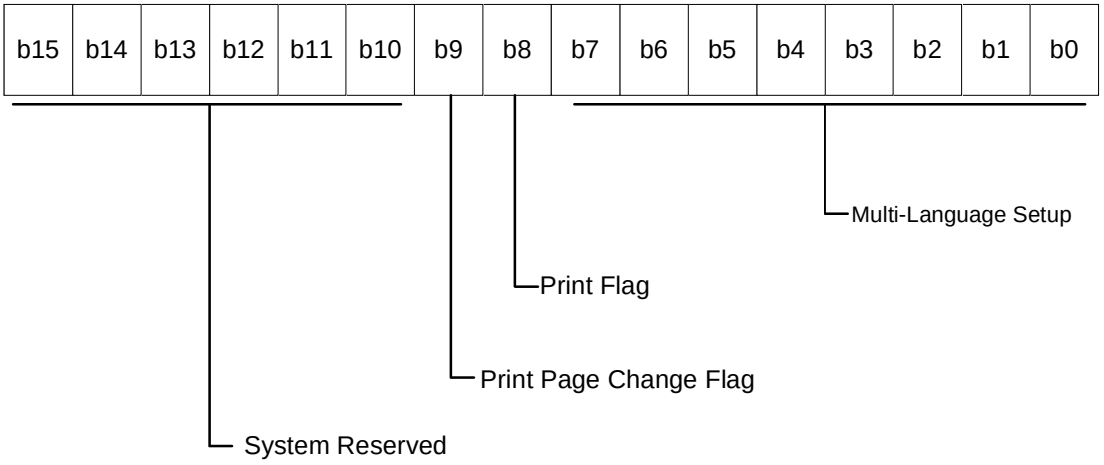


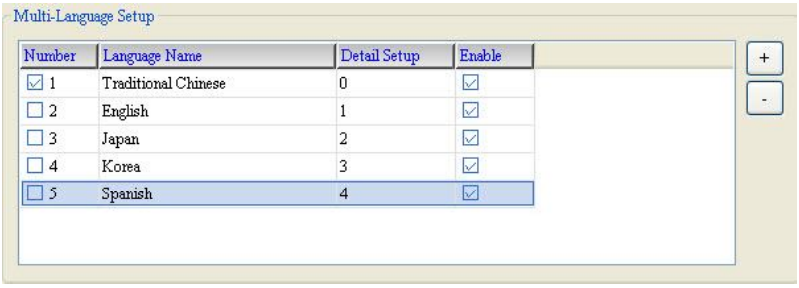
b0 ~ b15 – Define Recipe Group	➢ Users can define the number of the recipe group to be changed from the recipe group control register. By activating the recipe group change flag (Table 4-1-7 Recipe Control Register b0), the HMI will automatically change the RCPNO in the internal register, thus changing the recipe group.

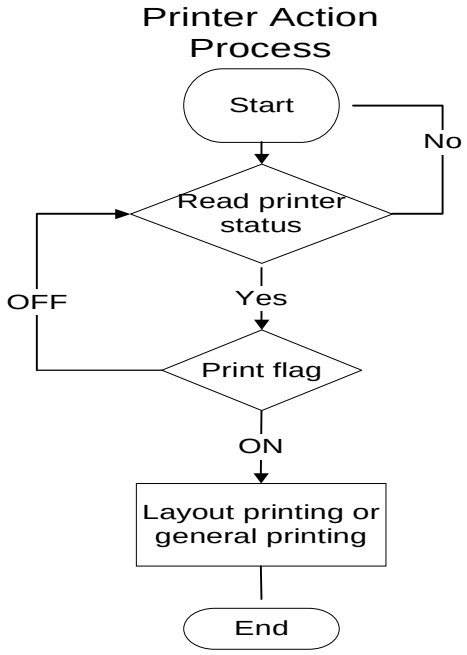
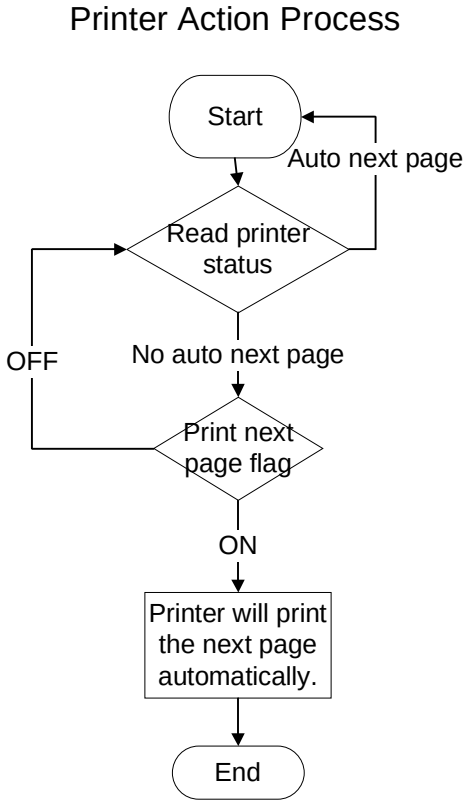
◆ System Control Flag Register

System Control Flag Register

Table 4-1-9 Control Block-- System Control Flag Register



b0 ~ b7 – Multi-language Setup	➢ Supports 16 languages. Users can change a language with the multi-language setup. Users can change a language from [Options]→ [Configuration...]→ [Others], as shown below. 
b8 – Print Flag	➢ The DOPSoft provides to printing options: (1) Print general screen (hard copy); (2) Screen layout. ➢ Please note that only one option can be used, and the screen layout mode is prioritized. ➢ When the print flag is ON, the printing task will be run according to the selected mode: print general screen or print screen layout. When the flag is OFF, the printer is idled

System Control Flag Register Table 4-1-9 Control Block-- System Control Flag Register	
	
b9 – Print Next Page Flag	➢ When the print next page flag is ON, the printer will automatically eject paper and turn to the next page. When the flag is OFF, the printer is idled. 

4-2 Status Block

The status block planned for the HMI allows users to define the address of the controllers or internal registers of the HMI. By configuring the status block, users can view the present status of the HMI, such as present screen number, present user security level, curves and history status, and the status of recipe control, multi-language, printing, etc. The status block is also a world-based continuous data block.

NOTE:

- ✓ If no control block is configured, the status block will be inactive. Also, the addresses in the control block and the status block cannot be the same.

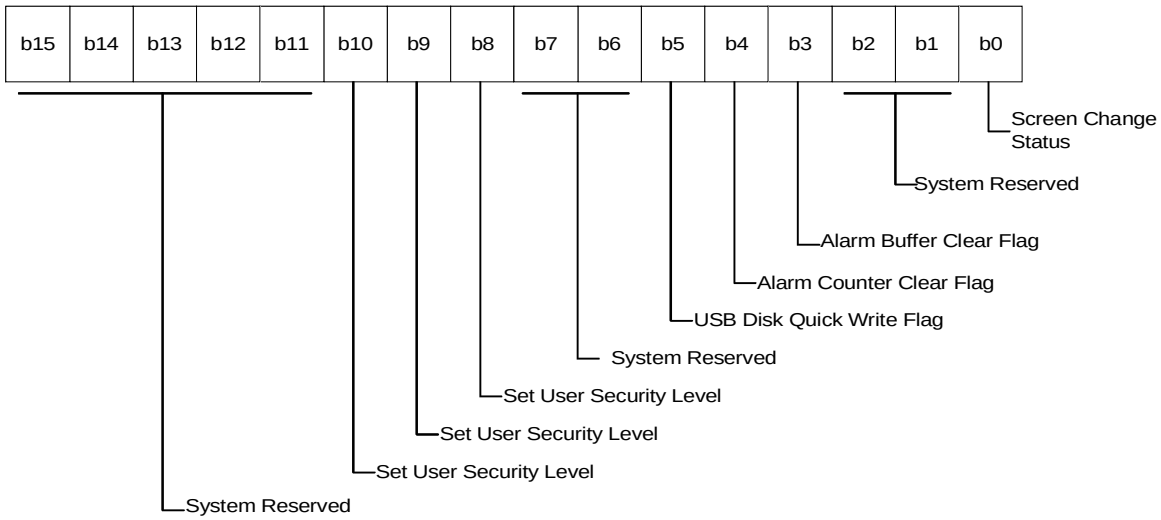
Status Block Register Types	Controller Register		Internal Memory	
	Register (D)	Demo Address	Register ($)	Demo Address
General Control Status	**D**n	**D**10	**$**n	**$**25
Screen Number Status	**D**n+1	**D**11	**$**n+1	**$**26
Curve Control Status	**D**n+2	**D**12	**$**n+2	**$**27
History Sampling Status	**D**n+3	**D**13	**$**n+3	**$**28
History Clearing Status	**D**n+4	**D**14	**$**n+4	**$**29
Recipe Control Status	**D**n+5	**D**15	**$**n+5	**$**30
Recipe Group Control Status	**D**n+6	**D**16	**$**n+6	**$**31
System Control Flag Status	**D**n+7	**D**17	**$**n+7	**$**32

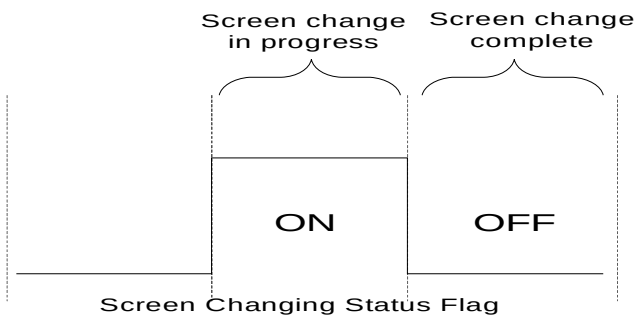
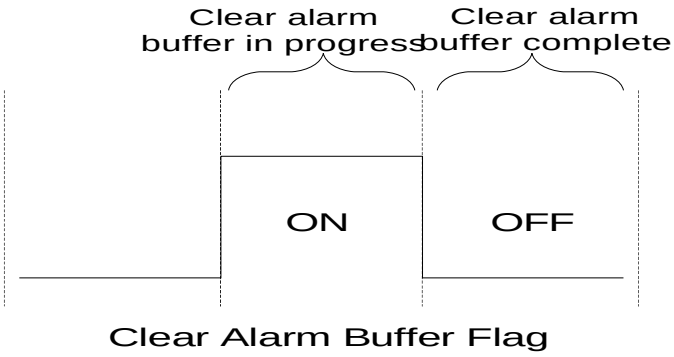
Table F4-2-1 Status Block Register Types

◆ General Control Status Register

General Control Status Register

Table 4-2-2 Status Block—General Control Status Registers



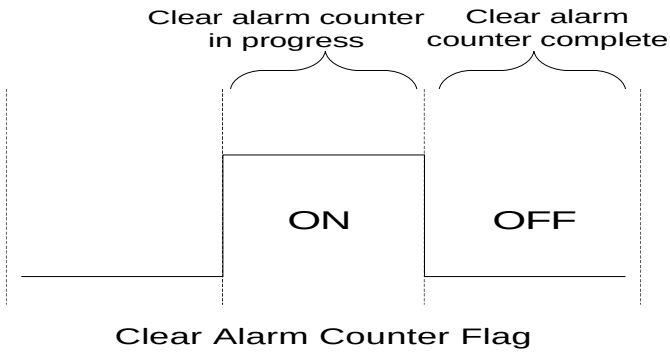
b0 – Screen Changing Status	➢ This flag is ON when screen change is in progress. ➢ This flag is OFF when screen change is completed. 
b3 – Clear Alarm Buffer	➢ This flag is ON when clear alarm buffer is in progress. ➢ This flag is OFF when clear alarm buffer is completed. 
b4 – Clear	➢ This flag is ON when clear alarm counter is in progress.

General Control Status Register

Table 4-2-2 Status Block—General Control Status Registers

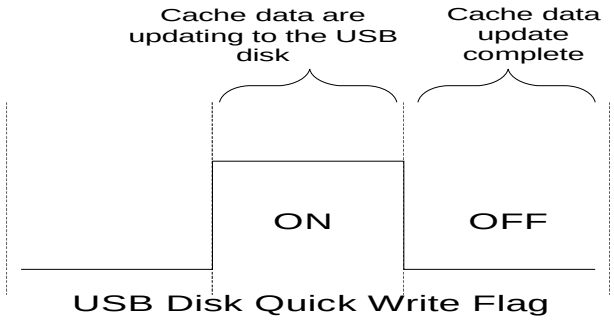
Alarm Counter

- This flag is OFF when clear alarm counter is completed.



b5 – USB Disk Quick Write

- This flag is ON when HMI cache data are updating to the USB disk.
- This flag is OFF when data update is completed.



b8 ~ b10 – Set User Security Level

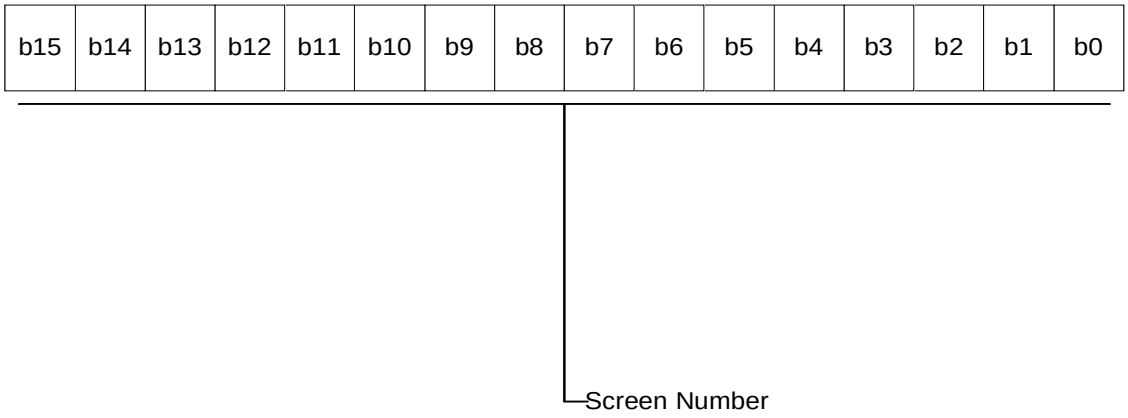
- From Bits 8-10, we can find out the security level of present HMI operators.

Security Level	Flag Control		
	Bit 10	Bit 9	Bit 8
Security Level 0	0	0	0
Security Level 1	0	0	1
Security Level 2	0	1	0
Security Level 3	0	1	1
Security Level 4	1	0	0
Security Level 5	1	0	1
Security Level 6	1	1	0
Security Level 7	1	1	1

◆ Screen Number Status Register

Screen Number Status Register

Table 4-2-3 Status Block—Screen Number Status Register

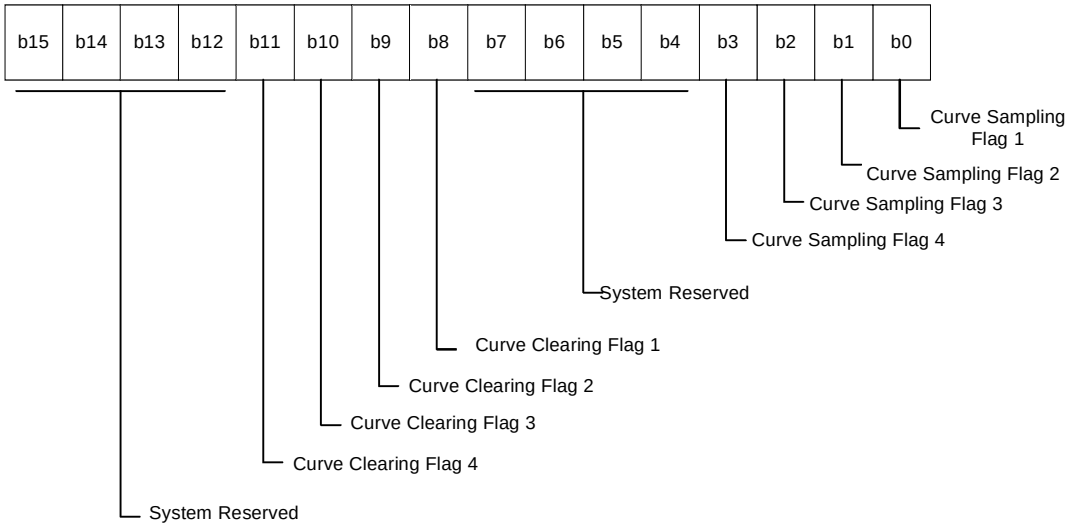


b0 ~ b15 – Screen Number Status	➢ Users can check the number of the last opened screen with this status register.

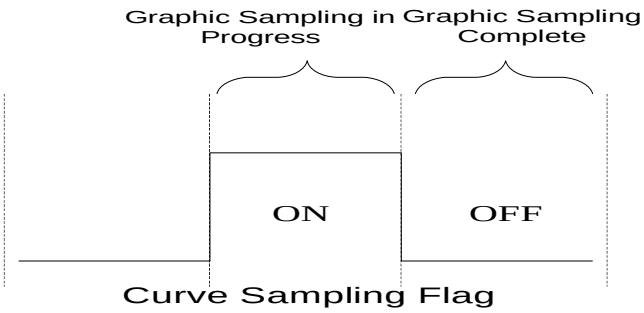
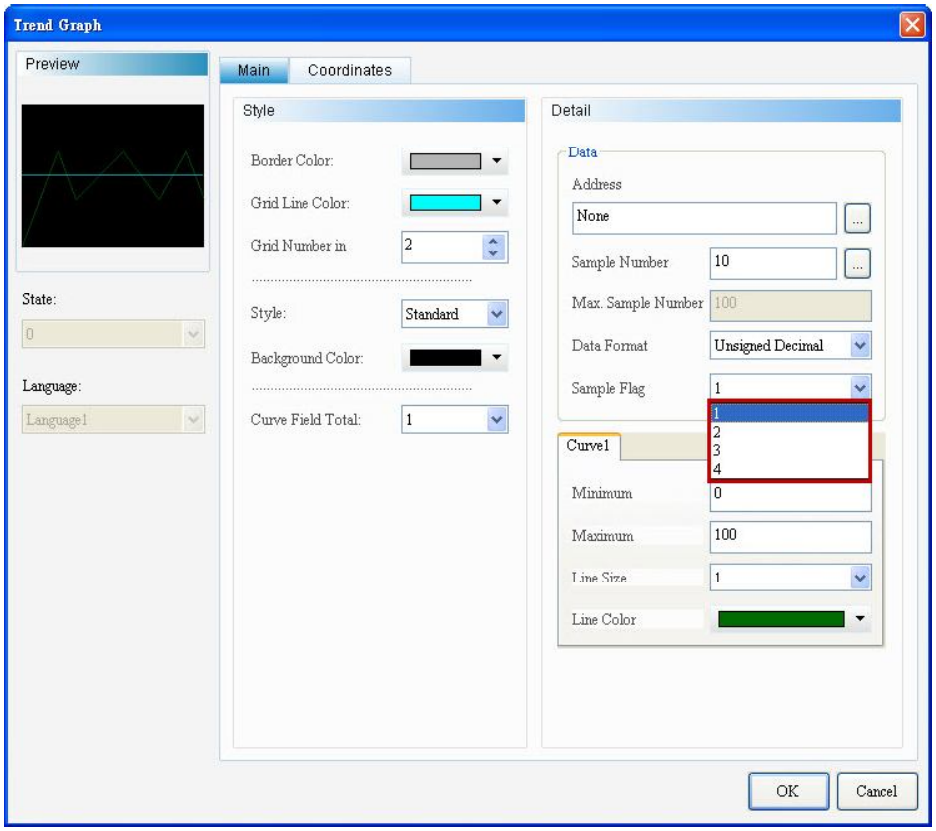
◆ Curve Control Status Stratus

Curve Control Status Stratus

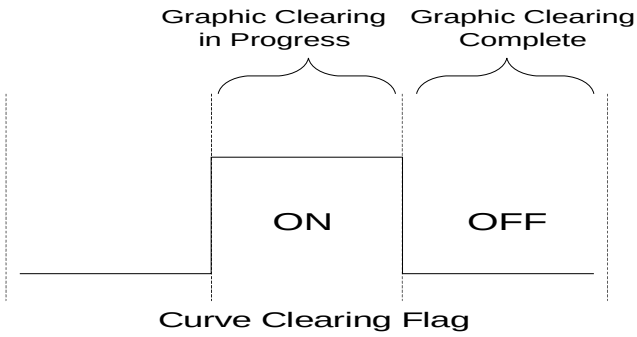
Table 4-2-4 Status Block-- Curve Control Status Stratus



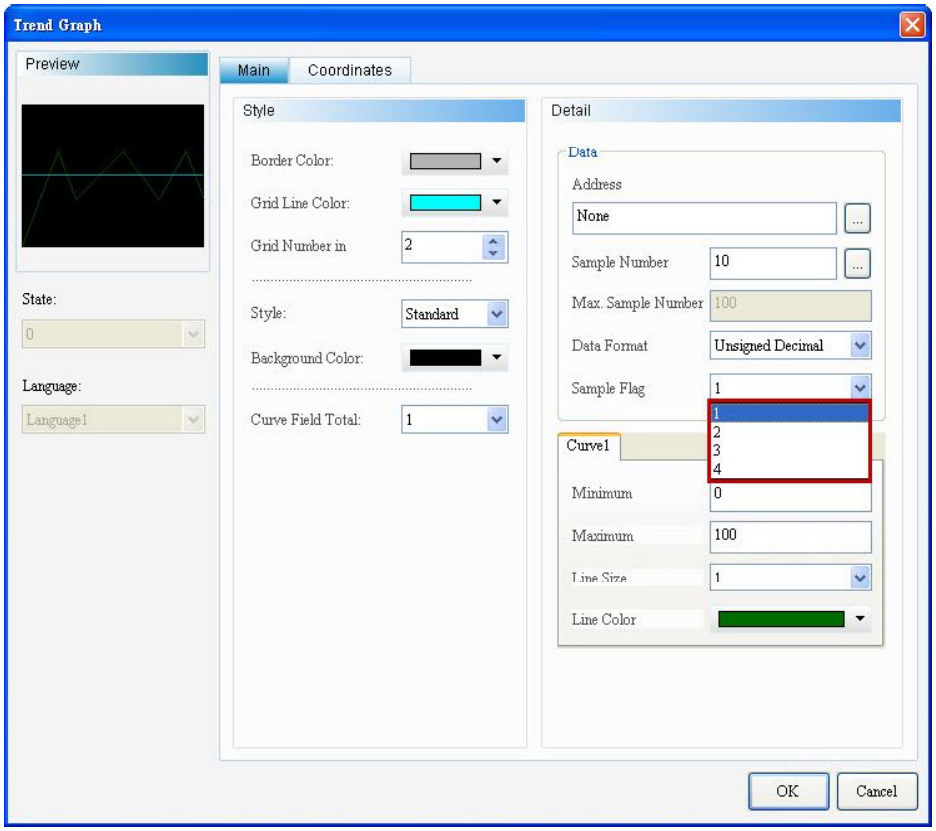
b0 ~ b3 – Curve Sampling Status Flags (1~4)	➢ The corresponding curve sampling status flag is ON when the element of general or X-Y curves samples data. The flag is OFF immediately after data sampling.

Curve Control Status Stratus Table 4-2-4 Status Block-- Curve Control Status Stratus	
	 ➢ The sampling flag 1 of the curve element should correspond to the curve sampling flag 1, sampling flag 2 of the curve element to the curve sampling flag 2, etc. 
b8 ~ b11 – Curve Clearing Status Flags (1~4)	➢ When the element of general or X-Y curves clears data, the corresponding curve sampling status flag is ON. The flag is OFF immediately after data clearing.

Curve Control Status Stratus Table 4-2-4 Status Block-- Curve Control Status Stratus	



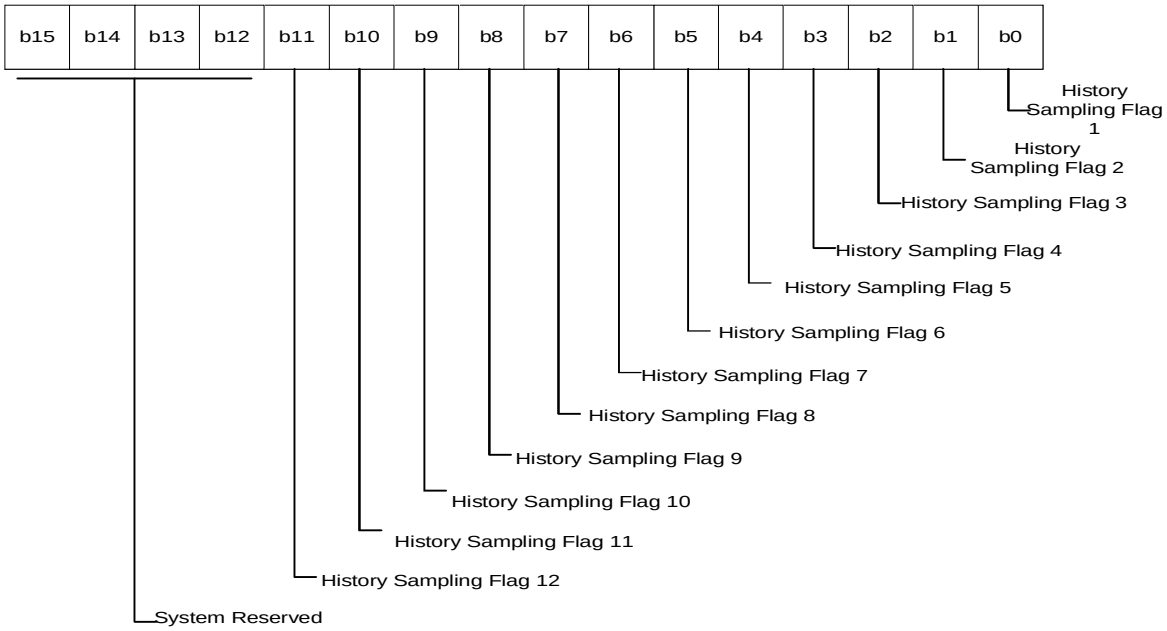
- The clearing flag 1 of the curve element should correspond to the curve clearing flag 1, clearing flag 2 of the curve element to the curve clearing flag 2, etc.



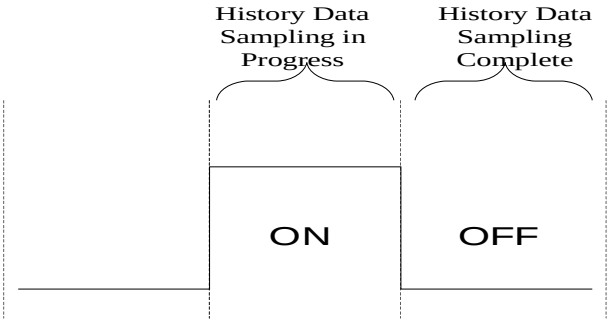
◆ History Sampling Status Register

History Sampling Status Register

Table 4-2-5 Status Block—History Sampling Status Register



b0 ~ b11 – History Sampling Status Flags (1 ~ 12)	➢ When history sampling is in progress, the corresponding history sampling status flag is ON. The flag is OFF immediately after history sampling is completed.

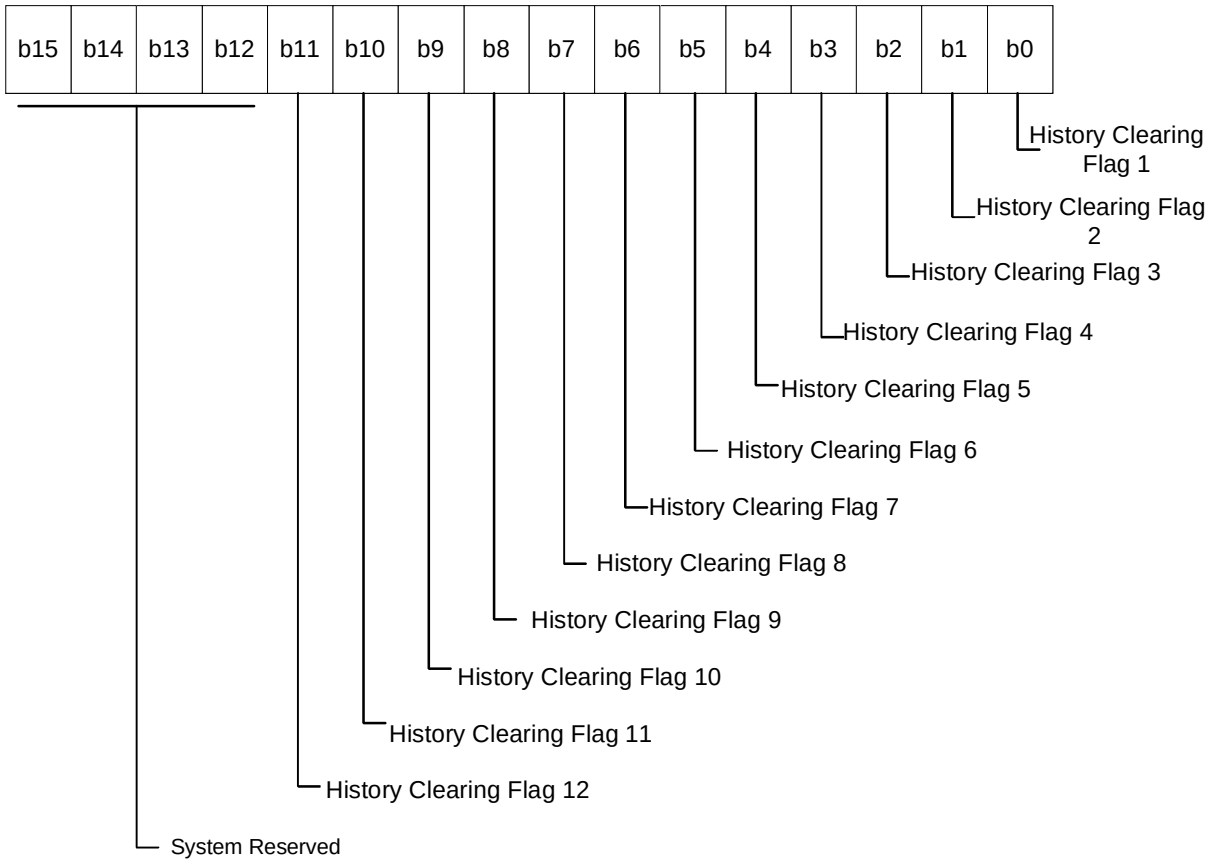


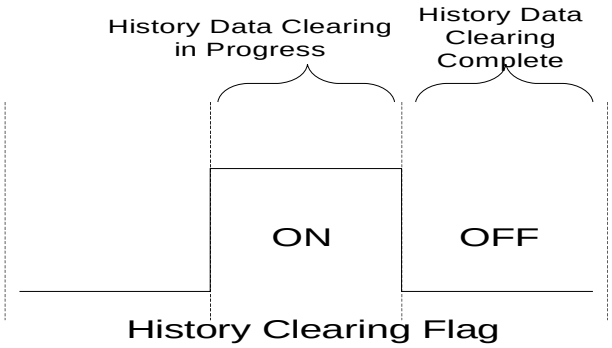
History Sampling Flag

◆ Clear History State Register

Clear History State Register

Table 4-2-6 Clear History State Register

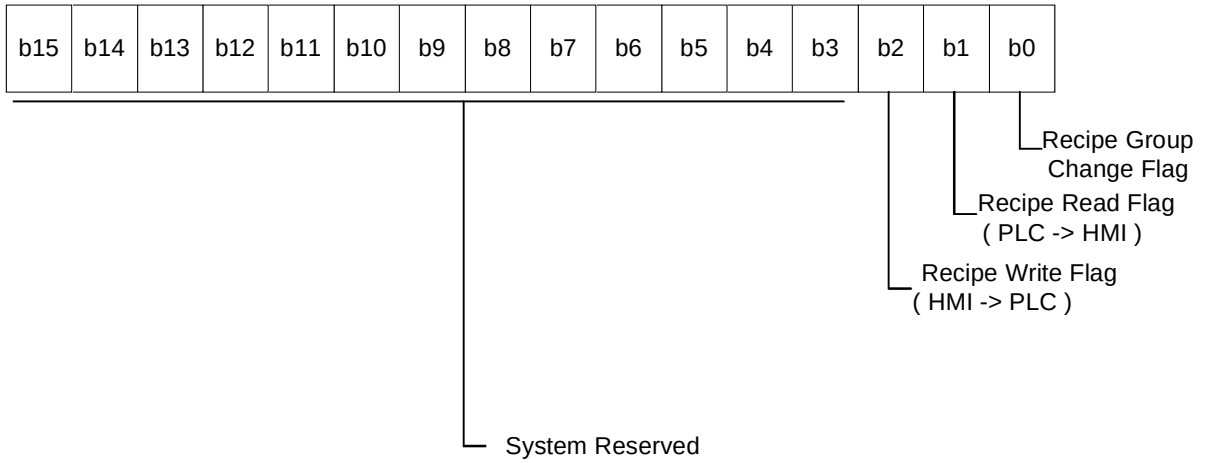


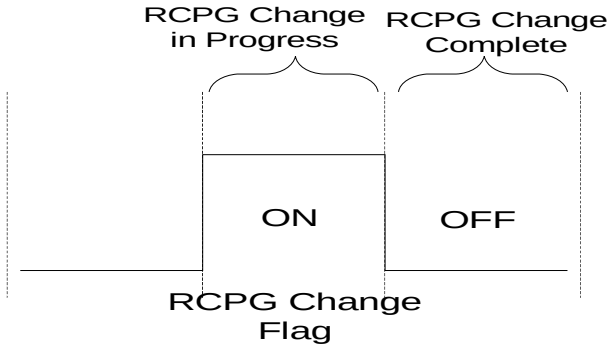
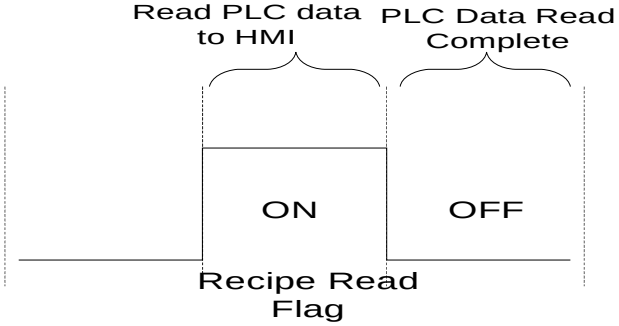
b0 ~ b11 –History Clearing Status Flags (1 ~ 12)	➢ When history clearing is in progress, the corresponding history clearing status flag is ON. The flag is OFF immediately after history clearing is completed. 

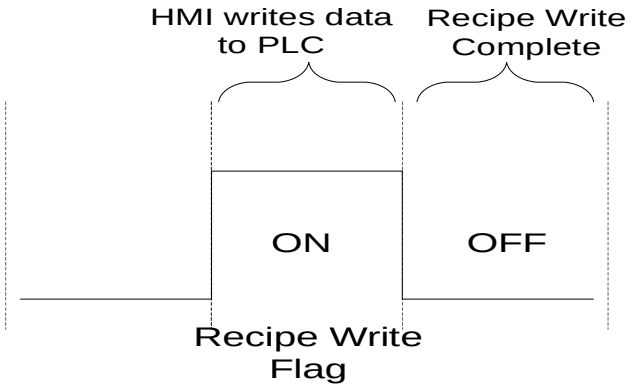
◆ Recipe Control Status Register

Recipe Control Status Register

Table 4-2-7 Status Block—Recipe Control Status Register



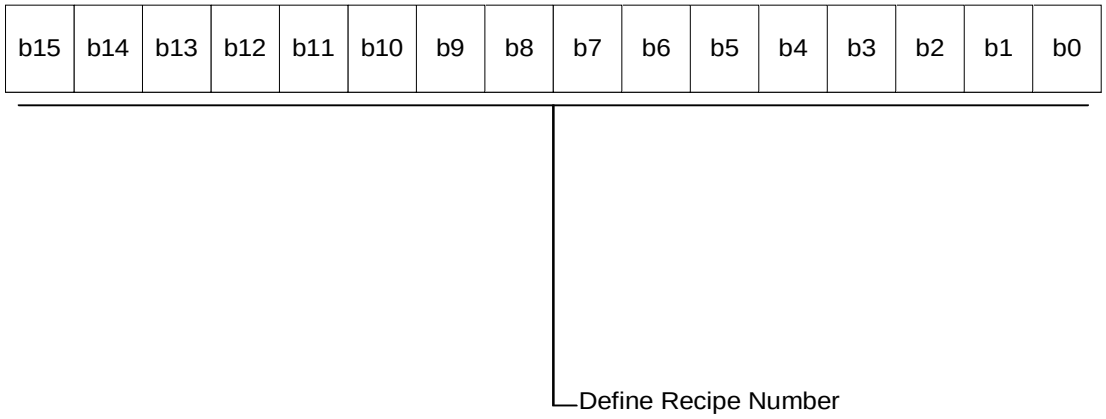
b0 – Recipe Number Change Status Flag	➢ When the control recipe group in the status block changes, the recipe group change status flag is ON. The flag is immediately OFF after changing the recipe group and updating the RCPNO. 
b1 – Recipe Read Status Flag	➢ When the HMI reads the data of a recipe group from the control block, the recipe read status flag is ON. The flag is OFF immediately after the data are read and saved. 
b2 – Recipe	➢ When the HMI sends the data of a recipe group to the control block,

Write Status Flag	the recipe write status flag is ON. The flag is OFF immediately after data are written to the control block. 

◆ Recipe Number Control Status Register

Recipe Number Control Status Register

Table 4-2-8 Status Block—Recipe Number Control Status Register

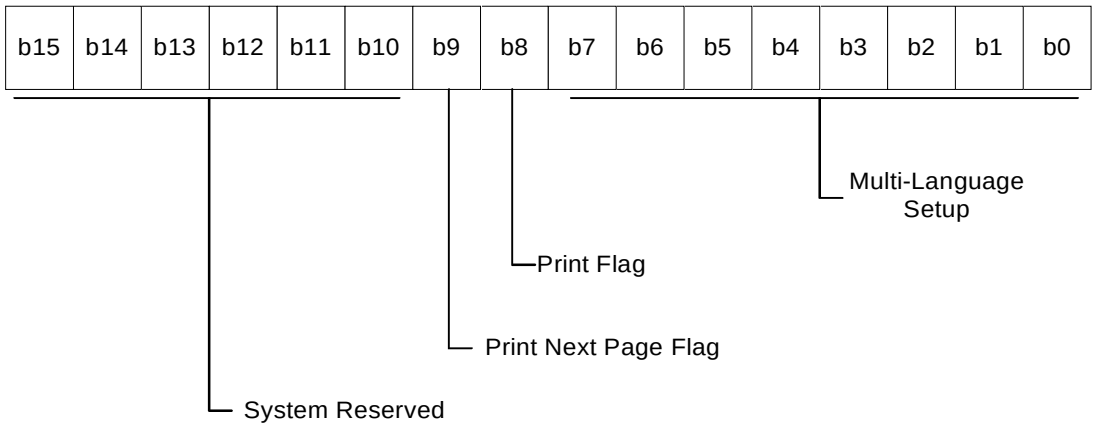


b0 ~ b15 – Recipe Number Definition Status	➢ Whether it is changing the value of the recipe number (RCPNO) register from the control block or HMI, as long as the value is changed, the value in the RCPNO register is updated to enable the control block to obtain the up-to-date recipe number from this register. ➢ This RCPNO definition flag must be used along with the RCPNO change flag. Please refer to Table 4-2-7 Recipe Control Stratus Register b0.

◆ System Control Status Register

System Control Status Register

Table 4-2-9 Status Block-- System Control Status Register



b0 ~ b7 – Multi-Language Setup	➢ Displays the corresponding status of the language in use.
b8 – Print Status Flag	➢ When the flag is ON, the printer is printing the display screen or edited screen of the HMI. When the flag is OFF, the printer is idled.
b9 – Print Next Page Status Flag	➢ When the flag is ON, the printer is ejecting paper to turn to the next page. When the flag is OFF, the printer is idled.