Appendix 2. Flag List

1) User Flag List

Keyword	Type	Write	Name	Description
_LER	BOOL	Enable	Operation error latch flag	Operation error latch flag by the program block(BP). Error indication occurred while executing a program block
_ERR	BOOL	Enable	Operation error latch flag	Operation error flag by the operation function (FN) or function block(FB). It is newly changed whenever an operation is executed.
_T20MS *	BOOL	–	20 ms Clock	These clock signals are used in the user programs, toggles on/off every half cycle. The clock signal can be delayed or distorted in accordance with program execution time as the signal toggles after scan has been finished, therefore, it is recommended that clock of enough longer than scan time be used. Clock signals starts from Off when the initialization program or scan program starts • Example : _T100MS clock
_T100MS *	BOOL	–	100 ms Clock	
_T200MS *	BOOL	–	200 ms Clock	
_T1S *	BOOL	–	1s Clock	
_T2S *	BOOL	–	2s Clock	
_T10S *	BOOL	–	10s Clock	
_T20S *	BOOL	–	20s clock	
_T60S *	BOOL	–	60s Clock	
_ON *	BOOL	–	Always On	Usable in user programs.
_OFF *	BOOL	–	Always Off	Usable in user programs
_1ON *	BOOL	–	First scan On	Turn On only during the first scan after the operation has started.
_1OFF *	BOOL	–	First scan Off	Turn Off only during the first scan after the operation has started.
_STOG *	BOOL	–	Scan Toggle	Toggles On/Off at every scan while a user program is being executed. (On at the first scan)
_INT_DONE	BOOL	Enable	Initialization Program Complete	If this flag is set to on in the initialization program in an user program, the initialization program stop its operation and the scan program will starts.
_INT_DATE	DATE	–	RTC present date	Date Data of standard format (Reference date – Jan. 1, 1984)
_RTC_TOD	TOD	–	RTC present time	Time Data(Reference time – 00:00:00)
_RTC_WEEK	UNIT	–	RTC present day	Day data (0: Monday, 1:Thuesday, 2: Wednesday , 3: Thursday, 4: Friday, 5: Saturday, 6:Sunday)

REMARK

1) Flags with the mark ' * are initialized when the initialization program starts, and after its execution has been competed the flags will change in accordance with the restart mode set.
• If cold or warm restart has been set, the flags will be initialized when the scan program starts its execution.
 If hot restart has been set , the flags will be restored to the state before the last stop when the scan program starts its execution.

2) Representative System Error Flag List

Keyword	Type	Bit No.	Name	Description
_CNF_ER	WORD	Representative keyword	System error (fatal error)	This flag handles the following operation stop error flags in batch.
_IO_TYER	BOOL	Bit 1	Module type inconsistency error	This representative flag indicates that I/O configuration parameters differ from the real loaded module or that a certain module is loaded onto a slot where it should not be loaded. (Refer to _IO_TYER_N and _IO_DEER[n])
_IO _DEER	BOOL	Bit 2	Module loading/unloading error	This representative flag indicates that module configuration of each slot has been changed during operation. (Refer to _IO_DEER_N and _IO_DEER[n])
_FUSE _ER	BOOL	Bit 3	Fuse disconnection error	This representative flag indicates that one of fuses of slots including them has disconnection. (Refer to _FUSE_ER_N and _FUSE_ER[n])
_IO _RWER	BOOL	Bit 4	I/O module read/write error	This representative flag indicates that a I/O module does normally executes read/write. (Refer to _IP_RWER_N and _IP_IFER[n])
_SP _IFER	BOOL	Bit 5	Special/communicat -ions module interface error	This representative flag indicates that special or communications module has failed in initialization or normal interface is impossible due to module malfunction. (Refer to _IP_IFER_N and _IP_IFER[n])
_ANNUN_ER	BOOL	Bit 6	External device fatal fault detection error	This representative flag indicates that an external device has fatal error. The error code has been written to _ANC_ERR[n].
–	–	Bit 7	–	–
_WD_ER	BOOL	Bit 8	Scan watch dog error	This flag indicates that the scan time of a program has overrun the scan watchdog time specified by the parameter.
_CODE_ER	BOOL	Bit 9	Program code error	This flag indicates that an unreadable instruction has been met while executing an user program.
_P_BCK_ER	BOOL	Bit 11	Program error	This flag indicates that program execution is impossible due to destroyed memory or program error.

3) Representative System Warning Flag List

Keyword	Type	Bit No.	Name	Description
_CNF _WAR	WORD	Representative keyword	System warning	This flag treats the below warning flags relating to continuous operation in batch.
_D_BCK_ER	BOOL	Bit 1	Data backup error	This flag indicates
_AB_SD_ER	BOOL	Bit 3	Abnormal shutdown	This flag indicates that the program had been stopped during restore from power failure due to causes such as power off, and then cold restart has been executed and the continuous operation which retains the data is impossible. Usable in the initialization program. Automatically reset when the initialization program has finished. (The same things given above will be applied when the program has been stopped by the 'ESTOP' function)
_TASK_ERR	BOOL	Bit 4	Task collision (plus cycle and external tasks)	This flag indicates that task collision has occurred as execution request for a same task had been repeatedly invoked. (Refer to the flag _TC_BMAP[n] and _TC_CNT[n])
_BAT_ERR	BOOL	Bit 5	Battery fault	This flag detects and indicates that the voltage of the battery, which is used to backup user programs and data memory, is lower than the defined value.
_ANNUN_WR	BOOL	Bit 6	External device warning detection	This representative flag indicates that the user program has detected an ordinary fault of external devices and has written it to the flag _ANC_WB [n].
–	–	Bit 7	–	–
_HSPMT1_ER	BOOL	Bit 8	High speed link parameter 1 error	This representative flag detects error of each high speed link parameter when the high link has been enabled and indicates that high speed link cannot be executed. It will be reset when the high speed link is disabled.
_HSPMT2_ER	BOOL	Bit 9	High speed link parameter 2 error	
_HSPMT3_ER	BOOL	Bit 10	High speed link parameter 3 error	
_HSPMT4_ER	BOOL	Bit 11	High speed link parameter 4 error	

4) Detailed System Error and Warning Flag List

Keyword	Type	Data setting range	Name	Description
_IO_TYER_N	UINT	0 to 15	The number of slot whose module type is inconsistent.	This flag detects that I/O configuration parameters of each slot differ from the real loaded module configuration or a particular module is loaded onto the slot where modules cannot be loaded, and indicates the lowest slot No. of the detected slot numbers.
_IO_TYERR[n]	BYTE	n: 0 to 1	The location of slot where module type is inconsistent.	This flag detects that I/O configuration parameters of each slot differ from the real loaded module configuration or a particular module is loaded onto the slot where modules cannot be loaded, and indicates the slot locations in the bit map of base units.
_IO_DEER_N	UINT	0 to 15	The number of slot where module mounting/dismounting error occurred.	This flag detects that module configuration of each slot has been changed, that is, module mounting/dismounting error has been occurred, and indicates the lowest slot No. of the detected slot numbers.
_IO_DEERR[n]	BYTE	n: 0 to 1	The location of slot where module mounting/dismounting error occurred.	This flag detects that module configuration of each slot has been changed, that is, module mounting/dismounting error has been occurred, and indicates the slot locations in the bit map of base units.
_FUSE_ER_N	UINT	0 to 15	The number of slot where fuse breaks.	This flag detects that fuses of fuse-mounted modules has broken, and indicates the lowest slot No. of the detected slot numbers.
_FUSE_ERR[n]	BYTE	n: 0 to 1	The location of slot where fuse breaks.	This flag detects that fuses of fuse-mounted modules has broken, and indicates the slot locations in the bit map of base units.
_IO_RWER_N	UINT	0 to 15	The number of slot where I/O module read/write occurred.	This flag detects that input modules of a slot cannot be normally read from or written to, and indicates the lowest slot No. of the detected slot numbers.
_IO_RWERR[n]	BYTE	n: 0 to 1	The location of slot where I/O module read/write occurred.	This flag detects that input modules of a slot cannot be normally read from or written to, and indicates the slot locations in the bit map of base units.
_IP_IFER_N	UINT	0 to 15	Special/link module interface error slot No.	This flag detects that initialization cannot be executed for special or link module of a slot, or normal interface is impossible due to module malfunction, and indicates the lowest slot No. of the detected slot numbers.
_IP_IFERR[n]	BYTE	n: o to 1	Special/link module interface error location	This flag detects that initialization cannot be executed for special or link module of a slot, or normal interface is impossible due to module malfunction, , and indicates the slot locations in the bit map of base units.
_ANC_ERR[n]	UINT	n : 0 to 7	External device fatal error	This flag detects fatal error of external devices and its content is written to this flag. A number that identifies error type will be written to each of the sixteen locations. (The number 0 is not allowed)
_ANC_WAR[n]	UINT	n : 0 to 7	External device ordinary error	If the user program indicates a warning on the flag _ANC_WB[n], the bit locations are sequentially written to _ANC_WAR[n] from _ANC_WAR[0] complying with their occurrence sequence.
_ANC_WB[n]	BIT	n: 0 to 127	External device ordinary error bit map	The user program detects ordinary error of external device and the errors are indicated on a bit map. (The number 0 is not allowed)
_TC_BMAP[n]	BIT	n : 0 to 7	Task collision bit map	The flag detects that task collision has occurred because, while a task was being executed or ready for execution, an execution request has occurred for the same task, indicates the errors on a bit map.
_TC_CNT[n]	UINT	n : 0 to 7	Task collision counter	This flag detects task collision occurrence time for each task when executing a user program, indicates the task collision occurrence time.

4) Detailed System Error and Warning Flag List (continued)

Keyword	Type	Data setting range	Name	Description
_BAT_ER_TM	DATE & TIME	—	Batter voltage drop time	The first detection date and time of battery voltage drop are written to this flag. It will be reset if the battery voltage has been restored.
_AC_F_CNT	UINT	0 to 65535	Momentary power failure occurrence count	The accumulated momentary power failure occurrence times during operation in the RUN mode is written to this flag.
_AC_F_TM[n]	DATE & TIME	n : 0 to 15	Momentary power failure history	The times of the latest sixteen momentary power failures are written.
_ERR_HIS[n]		n : 0 to 15	Error history	The times and error codes of the latest sixteen errors are written to this flag. • Stop time : DATE & TIME (8 bytes) • Error code : UINT (2 bytes)
_MODE_HIS[n]		n : 0 to 15	Operation mode change history	The times, operation modes and restart modes of the latest sixteen operation mode changes are written to this flag • Change time : DATE & TIME (8 bytes) • Operation mode : UINT (2 bytes) • Restart : UINT (2 bytes)

* Write is available in user programs.

5) System Operation status Information Flag List

Keyword	Type	Data setting range	Name	Description
_CPU_TYPE	Unit	0 to 16	System type	GM1 : 0, GM2 : 1, (GM3 : 2, GM4 : 3, GM% : 4) (FSM : 5,6), Twofold : 16
_VER_NUM	Unit	-	O/S version No.	System O/S version No.
_MEM_TYPE	Unit	1 to 5	Memory module type	Type of program memory module (0: Unloading state, type : 0 to 5)
_SYS_STATE	Word	Representative keyword	PLC mode and operation status	System operation mode and operation state information
		Bit 0	Local control	Operation mode change is possible only by mode change switch or GMWIIN
		Bit 1	STOP	CPU module operation state
		Bit 2	RUN	
		Bit 3	PAUSE	
		Bit 4	DEBUG	
		Bit 5	Operation mode change factor	Operation mode change by mode change switch
		Bit 6	Operation mode change factor	Operation mode change by GMWIN
		Bit 7	Operation mode change factor	Operation mode change by remote GMWIN
		Bit 8	Operation mode change factor	Operation mode change by communications
		Bit 9	STOP by STOP function	Operation in the RUN mode is stopped by STOP function after the scan has finished
		Bit 10	Force input	Input junction force On/Off is being executed.
		Bit 11	Force output	Output junction force On/Off is being executed
		Bit 12	STOP by ESTOP function	Operation in the RUN mode is directly stopped by ESTOP function.
		Bit 13	-	-
		Bit 14	During monitoring	External monitoring is being executed for programs or variables
		Bit 15	Remote mode ON	Operation in the remote mode
_GMWIN_CNF	Byte	Representative keyword	GMWIN connection state	Connection state between CPU module and GMWIN
		Bit 0	Local GMWIN connection	Local GMWIN connection state
		Bit 1	Remote GMWIN connection	Remote GMWIN connection state
		Bit 2	Remote communications connection	Remote communications connection state
_RST_TY	Byte	Representative keyword	Restart mode information	Restart type of program which is being executed in present. (History)
		Bit 0	Cold restart	See the Section 4.5.1
		Bit 1	Warm restart	
		Bit 2	Hot restart	
_INIT_RUN	Bool	-	During initialization	An initialization program written by the user is being executed
_SCAN_MAX	Unit	-	Maximum scan time (ms)	Maximum scan time is written during operation.
_SCAN_MIN	Unit	-	Minimum scan time (ms)	Minimum scan time is written during operation.
_SCAN_CUR	Unit	-	Present scan time (ms)	Present scan time is continuously updated during operation.
_RTC_TIME[n]	BCD	N : 0 to 7	Present time	BCD data of present time of RTC (Example : 96-01-12-00-00-00-XX) _RTC _TIME[0] : year, _RTC _TIME[1] : month, _RTC _TIME[2] : day, _RTC _TIME[3] : hour, _RTC _TIME[4] : minute, _RTC _TIME[5] : second, _RTC _TIME[6] : day of the week, _RTC _TIME[7] : unused Day of the week : 0 : Mon., 1: Tue., 2: Wed., 3:Thur., 4:Fri., 5: Sat., 6:Sun.
_SYS_ERR	Unit	Error code	Error type	See the Section 12.5 Error Code List

6) System Configuration status Information Flag

(1) User Program Status Information

Keyword	Type	Data setting range	Name	Description
_DOMAN_ST	BYTE	Representative keyword	System S/W configuration information	GM1 : 0, GM2 : 1, (GM3 : 2, GM4 : 3, GM% : 4) (FSM : 5,6), Twofold : 16
		Bit 0	Basic parameter error	Checks and indicates Basic parameter error
		Bit 1	I/O configuration parameter error	Checks and indicates I/O configuration parameter error
		Bit 2	Program error	Checks and indicates Program error
		Bit 3	Access variable error	Checks and indicates Access variable error
		Bit 4	High speed link parameter error	Checks and indicates High speed link parameter error

(2) Operation Mode change switch Status Information

Keyword	Type	Data Setting range	Name	Description
_KEY_STATE	BYTE	Representative keyword	Mode setting switch position	Indicates the state mode setting switch of CPU module
		Bit 0	KEY_STOP	Indicates that the mode setting switch is in the STOP state.
		Bit 1	KEY_RUN	Indicates that the mode setting switch is in the RUN state.
		Bit 2	KEY_PAUSE/REMOTE	Indicates that the mode setting switch is in the PAUSE/REMOTE state.

(3) I/O Module Installation Status Information

Keyword	Type	Data Setting range	Name	Description
_IO_INSTALL[n]	BYTE	n : 0 to 1	I/O module installation location	Locations of slots where I/O modules are loaded are indicated in the bitmap of base units.

7) Communications Flag

- GLOFA Mnet / Fnet / Cnet Flag List

(1) Communication Module Information Flag List

- • n is the number of slot where a communications module is loaded. (n = 0 to 7)

Keyword	Type	Applicable Net	Name	Description
_CnVERNO	UINT	Mnet/Fnet/Cnet	Communications module version No.	• Communications module O/S version No.
_CnSTNOH _CnSTNOL	UINT UDINT	Mnet/Fnet/Cnet	Communications module station No.	• Indicates the number which is set on communications module station switch. Mnet : MAC station No. marked on the front of communication module. Fnet : Station switch No. marked on the front of communications module. Cnet : Station No. set by the frame editor 　　_CnSTNOH : Station No. set on the side of RS-232C 　　_CnSTNOL : Station No. set on the side of RS-422
_CnTXECNT	UINT	Mnet/Fnet/Cnet	Communications frame sending error	• Increments by one whenever sending error of communications frame occurs. • Connection condition of network is evaluated by this value. • In Cnet, this value is the sum of errors occurred during receiving through RS-232 and RS-422.
_CnRXECNT	UINT	Mnet/Fnet/Cnet	Communications frame receiving error	• Increments by one whenever communications service fails. • Connection condition of network is evaluated by this value. Overall network communications quantity and program stability are also evaluated by this value.
_CnSVCFCNT	UINT	Mnet/Fnet/Cnet	Communications service processing error	• Indicates the maximum time that is spent until every station connected to network has the token at least one time and sends a sending frame.
_CnSCANAV	UINT	Mnet/Fnet/Cnet	Maximum communications scan time (unit : 1 ms)	• Indicates the average time that is spent until every station connected to network has the token at least one time and sends a sending frame.
_CnSCANMN	UINT	Mnet/Fnet/Cnet	Average communications scan time (unit : 1 ms)	• Indicates the minimum time that is spent until every station connected to network has the token at least one time and sends a sending frame.
_CnLINF	UINT	Mnet/Fnet/Cnet	Minimum communications scan time (unit : 1 ms)	• Indicates operation state of communications module with a word.
_CnLNKMOD	BIT 15		Operation mode (RUN=1, TEST=0)	• Indicates that operation mode of communications module is in the normal operation mode or test mode.
_CnINRING	BIT 14		In-ring (IN_RING = 1)	• Indicates that the communications module can communicates(IN_RING = 1) with other station or not.
_CnIFERR	BIT 13		Interface error (error = 1)	• Indicates that interface with communications modules has been stopped.
_CnSVBSY	BIT 12		Insufficient common RAM (Insufficient = 1)	• Indicates that service cannot be offered due to insufficient common RAM. • Indicates communications module hardware defect or system O/S error.
_CnCRDER	BIT 11		Communications module system error (error = 1)	
_NETn_LIV[k] (k = 0 to 63, 　k:Station No.)	BIT ARRAY	Fnet	Stations connected to the network (1=connected, 0=disconnected)	• Indicates whether k remote station or local PLC is connected to the network or not. The state value is written to each bit. These values shows present state of the network. (Write is disabled)
_NETn_RST[k] (k = 0 to 63, 　k:Station No.)	BIT ARRAY	Fnet	Re-connection of a station (1=re-connected, 0=no changed condition)	• Indicates re-connected stations, which had been disconnected before, on a bitmap. Because this value has been replaced with '1' when re-connected, the user program has to clear this value with '0' so that next re-connection can be detected. (Write is enabled)
_NETn_232[k] (k = 0 to 63, 　k:Station No.)	BIT ARRAY	Cnet	The indication that the user defined frame has been received. Indicated at each setting No. (Received = 1).	• When a receiving frame is received through RS-232C while the part of RS-232C in Cnet is operating in the user-defined mode, the bit corresponding to setting No. is turned ON. If RCV_MSG F/B has read that, that bit will be cleared with 0.
_NETn_422[k] (k = 0 to 63, 　k:Station No.)	BIT ARRAY	Cnet	The indication that the user defined frame has been received. Indicated at each setting No. (Received = 1).	• When a receiving frame is received through RS-422 while the part of RS-232C in Cnet is operating in the user-defined mode, the bit corresponding to setting No. is turned ON. If RCV_MSG F/B has read that, that bit will be cleared with 0.

(1) Communications Module Information Flag List (continued)

Keyword	Type	Applicable Net	Name	Description
_FSMn_reset	BIT	Fnet	Remote I/O station S/W reset	• Requests reset for remote I/O station (Write is enabled) Request can be done individually or wholly complying with the settings in the FSMn_st_no.
_FSMn_io_reset	BIT	Fnet	Remote I/O station digital output reset	• Requests output reset for remote I/O station (Write is enabled) • Request can be done individually or wholly complying with the settings in the FSMn_st_no.
_FSMn_hs_reset	BIT	Fnet	Remote I/O station high speed link information initialization	• If a momentary power failure occurs in the remote I/O station, the operation mode bit of high speed link information turns off and link trouble has the value 1. If the bit is turned on to clear that bit, the operation mode bit turns on and link trouble is cleared with 0. • Request can be done individually or wholly complying with the settings in the FSMn_st_no.
_FSMn_st_no	USINT		Numbers of I/O stations where _FSMn_reset, _FSMn_io_reset and _FSMn_hs_reset will be executed. (Write is enabled)	• Sets the numbers of I/O stations where _FSMn_reset, _FSMn_io_reset and _FSMn_hs_reset will be executed. (Write is enabled) • 00 to 63 ➡ individual station No. setting • 255 ➡ Whole station No. setting

(2) Detailed High Speed Link Information Flag List

Keyword	Type	Applicable Net	Name	Description

_HSmRLINK	Bit	Fnet/Mnet	High speed link RUN link information	• Indicates that all stations are normally operating complying with the parameter set in the high speed link. This flag turns on under the following conditions.
				  1) All stations set in the parameter are in the RUN mode and have no error, and
				  2) All blocks set in the parameter normally communicate, and
				  3) The parameter set in all stations, which are set in the parameter, normally communicate.
				
				• Once this flag is turned on, it maintains that state as long as link enable does not make that state stopped.

_HSmLTRBL	Bit	Fnet/Mnet	High speed link trouble information	• This flag turns on when, under the condition that _HSmRLINK is turned on, communications of the stations and data blocks set in the parameter is under the following conditions.
				  1) A station set in the parameter is not in the RUN mode, or
				  2) A station set in the parameter has an error, or
				  3) The communications of data blocks set in the parameter does not normally operate.
				• This flag turns on if the above conditions 1), 2) and 3) occur. If those conditions are restored, it will turn off again.

_HSmSTATE[k] (k = 0 to 63, k:Station No.)	Bit Array	Fnet/Mnet	K Data Block overall communications state information	• Indicates overall communications state of every blocks of the parameters set. _HSmSTATE[k] = _HSmMOD[k] & _HSmTRX[k] & _HSmERR[k]
_HSmMOD[k] (k = 0 to 63, k:Station No.)	Bit Array	Fnet/Mnet	K Data Block setting stations mode information. (RUN = 1, others =-0)	• Indicates the operation modes of stations set the K data block of parameters.
_HSmTRX[k] (k = 0 to 63, k:Station No.)	Bit Array	Fnet/Mnet	K Data Block communications state information (Normal = 1, abnormal = 0)	• Indicates that communications of the K data block of parameters are normally operating as set or not. .
_HSmERR[k] (k = 0 to 63, k:Station No.)	Bit Array	Fnet/Mnet	K Data Block setting stations state information. (Normal = 1, abnormal = 0)	• Indicates that the stations set in the K data block of parameters have an error or not.