

Appendix 1 Special soft device list

Here we mainly introduce the functions of special soft device, data register and FlashROM, and introduce the address of expansion. Users can scan fast.

Appendix 1-1 . Special Auxiliary Relay List

Appendix 1-2 . Special Data Register List

Appendix 1-3 . Special Module Address List
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Appendix 1-4 . Special Flash Register List
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Appendix 1-1 . Special Auxiliary Relay List

PC Status (M8000-M8003)

ID	Function	Description	
M8000	Normally ON coil when running		M8000 keeps being ON status when PLC is running
M8001	Normally OFF coil when running		M8001 keeps being OFF status when PLC is running
M8002	Initial positive pulse coil		M8002 be ON in first scan cycle
M8003	Initial negative pulse coil		M8003 be OFF in first scan cycle

Clock (M8011-M8014)

ID	Function	Description
M8011	Shake with the cycle of 10ms	
M8012	Shake with the cycle of 100ms	
M8013	Shake with the cycle of 10sec	
M8014	Shake with the cycle of 1min	

Flag (M8020-M8029)

ID	Function	Description
M8020	Zero	The plus/minus operation result is 0
M8021	Borrow	“borrow” occurs in minus operation
M8022	Carry	When carry occurs in plus operation or overflow occurs in bit shift operation
M8023		
M8026	RAMP Mode	
M8029		

PC Mode (M8030-M8038)

ID	Function	Description
M8030	PLC initializing	
M8031	Non-retentive register reset	When driving this M, ON/OFF mapping memory of Y, M, S, TC and the current values of T, C, D are all reset to be 0
M8032	Retentive register reset	
M8033	Registers keep stopping	When PLC changes from RUN to STOP, leave all content in mapping registers and data registers
M8034	All output forbidden	Set PC's all external contacts to be OFF status
M8038	Parameter setting	Set communication parameters flag

Stepping Ladder (M8041-M8046)

ID	Function	Description
M8041		
M8045	All output reset forbidden	When shifting the mode, all outputs reset functions are forbidden
M8046	STL status activate	When M8047 activating, act when any device of S0~S999 turns to be ON

Interruption (M8050-M8059)

ID	Function	Description
M8050 I000	Forbid the input interruption 0	After executing EI instruction, even the interruption is allowed, but if M acts at this time, the correspond input interruption couldn't act separately E.g. : when M8050 is ON, interrupt I000 is forbidden
M8051 I010	Forbid the input interruption 1	
M8052 I020	Forbid the input interruption 2	
M8053 I030	Forbid the input interruption 3	
M8054 I040	Forbid the input interruption 4	
M8055 I050	Forbid the input interruption 5	
M8056 I40	Forbid the time interruption 0	After executing EI instruction, even the interruption is allowed, but if M acts at this time, the correspond time interruption couldn't act separately
M8057 I41	Forbid the time interruption 1	
M8058 I42	Forbid the time interruption 2	
M8059	Forbid the interruption	Forbid all interruption

Error Testing (M8067-M8072)

ID	Function	Description
M8067	Operation error	happen when calculating
M8070	Scan time out	
M8071	No user program	Internal codes parity error
M8072	User program error	execution codes or configure table parity error

Communication (M8120-M8148)

	ID	Function	Description
COM1	M8120		
	M8121	Waiting to send via RS232	
	M8122	“sending by RS232” flag	
	M8123	“RS232 receiving finish” flag	
	M8124	RS232 receiving flag	
	M8125	“Receive incomplete” flag	acceptance ends normally, but the accepted data number is less than the required number
	M8126	Global signal	
	M8127	“Accept error” flag	
	M8128	“Accept correct” flag	
	M8129		
COM2	M8130		
	M8131	Waiting to send via RS232	
	M8132	“sending by RS232” flag	
	M8133	“RS232 receiving finish” flag	
	M8134	RS232 receiving flag	
	M8135	“Receive incomplete” flag	acceptance ends normally, but the accepted data number is less than the required number
	M8136	Global signal	
	M8137	“Accept error” flag	
	M8138	“Accept correct” flag	
	M8139		
COM3	M8140		
	M8141	Waiting to send via RS232	
	M8142	“sending by RS232” flag	
	M8143	“RS232 receiving finish” flag	
	M8144	RS232 receiving flag	
	M8145	“Receive incomplete” flag	acceptance ends normally, but the accepted data number is less than the required number
	M8146	Global signal	
	M8147	“Accept error” flag	
	M8148	“Accept correct” flag	
	M8149		

“High Speed Counter Interruption Finished” Flag (M8150-M 8169)

ID	Counter ID	Function	Description
M8150	C600	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8151	C602	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8152	C604	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8153	C606	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8154	C608	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8155	C610	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8156	C612	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8157	C614	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8158	C616	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8159	C618	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8160	C620	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8161	C622	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8162	C624	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8163	C626	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8164	C628	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8165	C630	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8166	C632	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8167	C634	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8168	C636	“Count Interruption Finished” Flag	Set flag ON when count interruption finish
M8169	C638	“Count Interruption Finished” Flag	Set flag ON when count interruption finish

Pulse output (M8170~M8238)

ID	Pulse ID	Function	specification
M8170	PULSE_1	“sending pulse” flag	Being ON when sending the pulse,
M8171		overflow flag of “32 bits pulse sending”	When overflow, Flag is on
M8172		Direction flag	1 is positive direction, the correspond direction port is on
M8173	PULSE_2	“sending pulse” flag	Being ON when sending the pulse,
M8174		overflow flag of “32 bits pulse sending”	When overflow, Flag is on
M8175		Direction flag	1 is positive direction, the correspond direction port is on
M8176	PULSE_3	“sending pulse” flag	Being ON when sending the pulse,
M8177		overflow flag of “32 bits pulse	When overflow, Flag is on

		sending”	
M8178		Direction flag	1 is positive direction, the correspond direction port is on
M8179	PULSE_4	“sending pulse” flag	Being ON when sending the pulse,
M8180		overflow flag of “32 bits pulse sending”	When overflow, Flag is on
M8181		Direction flag	1 is positive direction, the correspond direction port is on

absolute、relative bit:

ID	function	specification	
M8190	C600 (24 segments)	1 is absolute, 0 is relative	
M8191	C602 (24 segments)	1 is absolute, 0 is relative	
M8192	C604 (24 segments)	1 is absolute, 0 is relative	
M8193	C606 (24 segments)	1 is absolute, 0 is relative	
M8194	C608 (24 segments)	1 is absolute, 0 is relative	
M8195	C610 (24 segments)	
M8196	C612 (24 segments)		
M8197	C614 (24 segments)		
M8198	C616 (24 segments)		
M8199	C618 (24 segments)		
M8200	C620 (24 segments)		
M8201	C622 (24 segments)		
M8202	C624 (24 segments)		
M8203	C626 (24 segments)		
M8204	C628 (24 segments)		
M8205	C630 (24 segments)		
M8206	C632 (24 segments)		
M8207	C634 (24 segments)		
M8208	C636 (24 segments)		
M8209	C638 (24 segments)		
M8210	Pulse alarm flag (frequency change suddenly)	1 is alarm, 0 is correct	PULSE_1
M8211	Neglect the alarm or not	When flag is 1, stop sending alarm	PULSE_1
M8212	Pulse alarm flag (frequency change suddenly)	1 is alarm, 0 is correct	PULSE_2
M8213	Neglect the alarm or not	When flag is 1, stop sending alarm	PULSE_2
M8214	Pulse alarm flag (frequency change suddenly)	1 is alarm, 0 is correct	PULSE_3
M8215	Neglect the alarm or not	When flag is 1, stop sending alarm	PULSE_3
M8216	Pulse alarm flag (frequency change suddenly)	1 is alarm, 0 is correct	PULSE_4

M8217	Neglect the alarm or not	When flag is 1, stop sending alarm	PULSE_4
M8218	Pulse alarm flag (frequency change suddenly)	1 is alarm, 0 is correct	PULSE_5
M8219	Neglect the alarm or not	When flag is 1, stop sending alarm	PULSE_5

Positive/negative count

ID	Counter Nr.	Function	Specification
M8238	C300~C498	Positive/negative counter control	0 is increment counter, 1 is decrement counter, default is 0

24 segments HSC interruption loop (M8270~M8289)

ID	Counter ID	Specification	
M8270	24 segments HSC interruption loop (C600)	if set it to be 1, then loop executing the interruption; or else execute only one time interruption;	
M8271	24 segments HSC interruption loop (C602)		
M8272	24 segments HSC interruption loop (C604)		
M8273	24 segments HSC interruption loop (C606)		
M8274	24 segments HSC interruption loop (C608)		
M8275	24 segments HSC interruption loop (C610)		
M8276	24 segments HSC interruption loop (C612)		
M8277	24 segments HSC interruption loop (C614)		
.....		
M8279	24 segments HSC interruption loop (C618)		
M8280	24 segments HSC interruption loop (C620)	if set it to be 1, then loop executing the interruption; or else execute only one time interruption;	
M8281	24 segments HSC interruption loop (C622)		
.....		
M8284	24 segments HSC interruption loop (C628)		
M8285	24 segments HSC interruption loop (C630)	if set it to be 1, then loop executing the interruption; or else execute only one time interruption;	
.....		
M8289	24 segments HSC interruption loop (C638)		

Read & Write the Expansions (M8340~M8341)

ID	Function	Specification
M8340	Read the expansion error flag (read instruction)	
M8341	Write the expansion error flag (write instruction)	

BLOCK Execution (M8630~M8730)

ID	Function	Specification
M8630		
M8631	BLOCK1 is running flag	
M8632	BLOCK2 is running flag	
.....
.....
.....
M8730	BLOCK100 is running flag	

Appendix 1-2 . List of special memory and special data register

Clock (D8010-D8019)

ID	Function	Specification
D8010	The current scan cycle	Unit:0.1ms
D8011	The min. scan time	Unit:0.1ms
D8012	The max. scan time	Unit:0.1ms
D8013	Second (clock)	0~59 (BCD code)
D8014	minute (clock)	0~59 (BCD code)
D8015	hour (clock)	0~23 (BCD code)
D8016	day (clock)	0~31 (BCD code)
D8017	month (clock)	0~12 (BCD code)
D8018	year (clock)	2000~2099 (BCD code)
D8019	week (clock)	0 (Sunday)~6 (Saturday) (BCD code)

Flag (D8021-D8029)

ID	Function	Specification
D8021	Model	Low byte
	Series number	High byte
D8022	Compatible system’s version number	Low byte
	System’s version number	High byte
D8023	Compatible model’s version number	Low byte
	Model’s version number	High byte
D8024	Model’s information	Max 5 characters + “\0”
D8025		
D8026		
D8027	Suitable program software version	
D8028		
D8029		

Error check (D8067-D8098)

ID	Function	Specification
D8067	Operation error code's Nr.	The error of divide zero
D8068	lock the Nr. of error code	
D8069		
D8070	exceeded scan time	Unit 1ms
D8074	Nr. of offset registers D	
D8097		
D8098		

Communication (D8120-D8149)

	ID	Function	specification
Com 1	D8120		
	D8121		
	D8122	the left data RS232 should send	
	D8123	Data number RS232 received	
	D8126		
	D8127	Communication error code	7: hardware error 8: CRC Parity error 9: station number error 10: no start code 11: no end code 12: communication time out
	D8128	Modbus communication error (the replied message from slaves when the master send errors)	0: correct 1: don't support function ID 2: address error (overrun address) 3: Data error (the number of data) 8: saving data error (rewrite Flash)
	D8129		
	D8129		
Com2	D8130		
	D8131		
	D8132	the left data RS232 should send	
	D8133	Data number RS232 received	
	D8136		

	D8137	Communication error code	7: hardware error 8: CRC check error 9: station number error 10: no start sign 11: no end sign 12: communication time out
	D8138	Modbus communication error (the replied message from slaves when the master send errors)	0 : correct 1: don't support function ID 2: address error(overflow address) 3: Data error (the number of data) 8 : saving data error (rewrite Flash)
	D8139		
Com 3	D8140		
	D8141		
	D8142	the left data RS232 should send	
	D8143	Data number RS232 received	
	D8146		
	D8147	Communication error code	7: hardware error 8: CRC check error 9: station number error 10: no start sign 11: no end sign 12: communication time out
	D8148	Modbus communication error (the replied message from slaves when the master send errors)	0 : correct 1: don't support function ID 2: address error(overflow address) 3: Data error (the number of data) 8 : saving data error (rewrite Flash)
	D8149		

HSC Interruption Station (D8150-D8169)

ID	Counter ID	function	specification
D8150	C600	The current segment (No.n segment)	
D8151	C602	The current segment	
D8152	C604	The current segment	
D8153	C606	The current segment	
D8154	C608	The current segment	
D8155	C610	The current segment	
D8156	C612	The current segment	
D8157	C614	The current segment	

D8158	C616	The current segment	
D8159	C618	The current segment	
D8160	C620	The current segment	
D8161	C622	The current segment	
D8162	C624	The current segment	
D8163	C626	The current segment	
D8164	C628	The current segment	
D8165	C630	The current segment	
D8166	C632	The current segment	
D8167	C634	The current segment	
D8168	C636	The current segment	
D8169	C638	The current segment	

Pulse output (D8170-D8220)

ID	Pulse ID	function	specification
D8170	PULSE_1	The low 16 bits of accumulated pulse number	
D8171		The high 16 bits of accumulated pulse number	
D8172		The current segment (means Nr.n segment)	
D8173	PULSE_2	The low 16 bits of accumulated pulse number	
D8174		The high 16 bits of accumulated pulse number	
D8175		The current segment (means Nr.n segment)	
D8176	PULSE_3	The low 16 bits of accumulated pulse number	Only XC5-32RT-E (4PLS) model has
D8177		The high 16 bits of accumulated pulse number	
D8178		The current segment (means Nr.n segment)	
D8179	PULSE_4	The low 16 bits of accumulated pulse number	
D8180		The high 16 bits of accumulated pulse number	
D8181		The current segment (means Nr.n segment)	
D8190	PULSE_1	The low 16 bits of the current accumulated current pulse number	
D8191		The high 16 bits of the current accumulated current pulse number	
D8192	PULSE_2	The low 16 bits of the current accumulated current pulse number	

D8193		The high 16 bits of the current accumulated current pulse number	
D8194	PULSE_3	The low 16 bits of the current accumulated current pulse number	Only XC5-32RT-E (4PLS) model has
D8195		The high 16 bits of the current accumulated current pulse number	
D8196	PULSE_4	The low 16 bits of the current accumulated current pulse number	
D8197		The high 16 bits of the current accumulated current pulse number	

ID	Pulse ID	Function	Description
D8210	PULSE_1	Error segment number	PULSE_1
D8212	PULSE_2	Error segment number	PULSE_2
D8214	PULSE_3	Error segment number	PULSE_3
D8216	PULSE_4	Error segment number	PULSE_4
D8218	PULSE_5	Error segment number	PULSE_5
D8220	Frequency Testing Precision	indicate the bit Nr. Behind the decimal dot, 1 means *10 , 2 means *100	

Absolute Positioning/Relative Positioning/the Origin Return (D8230-D8239)

ID	Pulse	Function	Description
D8230	PULSE_1	Rising time of the absolute/relation position instruction (Y0)	
D8231		Falling time of the origin return instruction (Y0)	
D8232	PULSE_2	Rising time of the absolute/relation position instruction (Y1)	
D8233		Falling time of the origin return instruction (Y1)	
D8234	PULSE_3	Rising time of the absolute/relation position instruction (Y2)	
D8235		Falling time of the origin return instruction (Y2)	
D8236	PULSE_4	Rising time of the absolute/relation position instruction (Y3)	
D8237		Falling time of the origin return instruction (Y3)	
D8238	PULSE_5	Rising time of the absolute/relation position instruction	
D8239		Falling time of the origin return instruction	

Read/Write the Expansion (D8315-D8316)

ID	Function	Description
D8315	Read the expansion's error type	
D8316	Write the expansion's error type	

Sequential Function Block (D8630-D8730)

ID	Function	Description
D8630		
D8631	The current executing instruction of BLOCK1	The value is used when BLOCK is monitoring
D8632	The current executing instruction of BLOCK2	The value is used when BLOCK is monitoring
.....
.....
.....
D8730	The current executing instruction of BLOCK100	The value is used when BLOCK is monitoring

Error information of the Expansions (D8600-D8627)

ID	Function	specification	Expansion ID
D8600	Read the expansion's error times		Expansion 1
D8601	Read the expansion's error	1. expansion's CRC parity error 2. expansion's address error 3. expansion's accepted data length error 4. expansion's accept buffer zone overflow 5. expansion's timeout error 6. CRC parity error when PLC is accepting data 7. unknown error	
D8602	write the expansion's error times		
D8603	write the expansion's error	
D8604	Read the expansion's times		
D8605	Read the expansion's error	Expansion 2
D8606	write the expansion's error times		
D8607	write the expansion's error	
D8608	Read the expansion's times		Expansion 3
D8609	Read the expansion's error	
D8610	write the expansion's error times		
D8611	write the expansion's error	

D8612	Read the expansion's times		Expansion 4
D8613	Read the expansion's error	
D8614	write the expansion's error times		
D8615	write the expansion's error	
.....
.....
D8624	Read the expansion's times		Expansion 7
D8625	Read the expansion's error	
D8626	write the expansion's error times		
D8627	write the expansion's error	

Appendix 1-3 . ID List of the Expansions

Take the first expansion module as the example:

Channel	AD signal	DA signal	PID Output value	PID run/stop bit	Set value	PID parameter: Kp, Ki, Kd, control range Diff, Death range death
XC-E8AD						
0CH	ID100	-	ID108	Y100	QD100	Kp----QD108 Ki-----QD109 Kd-----QD110 Diff----QD111 Death--QD112
1CH	ID101	-	ID109	Y101	QD101	
2CH	ID102	-	ID110	Y102	QD102	
3CH	ID103	-	ID111	Y103	QD103	
4CH	ID104	-	ID112	Y104	QD104	
5CH	ID105	-	ID113	Y105	QD105	
6CH	ID106	-	ID114	Y106	QD106	
7CH	ID107	-	ID115	Y107	QD107	
XC-E4AD2DA						
0CH	ID100	-	ID104	Y100	QD102	Kp----QD106 Ki-----QD107 Kd-----QD108 Diff----QD109 Death--QD110
1CH	ID101	-	ID105	Y101	QD103	
2CH	ID102	-	ID106	Y102	QD104	
3CH	ID103	-	ID107	Y103	QD105	
0CH	-	QD100	-	-	-	
1CH	-	QD101	-	-	-	

XC-E4DA

CH Nr.	Exp. 1	Exp. 2	Exp. 3	Exp. 4	Exp. 5	Exp. 6	Exp. 7
0CH	QD100	QD200	QD300	QD400	QD500	QD600	QD700
1CH	QD101	QD201	QD301	QD401	QD501	QD601	QD701
2CH	QD102	QD202	QD302	QD402	QD502	QD602	QD702
3CH	QD103	QD203	QD303	QD403	QD503	QD603	QD703

XC-E2DA

CH Nr.	Exp. 1	Exp. 2	Exp. 3	Exp. 4	Exp. 5	Exp. 6	Exp. 7
0CH	QD100	QD200	QD300	QD400	QD500	QD600	QD700
1CH	QD101	QD201	QD301	QD401	QD501	QD601	QD701

XC-E6PT-P/ XC-E6TC-P

CH Nr.	Current temp.	Set temp.	PID run/stop bit	The first 3CH PID value	The last 3CH PID value
0CH	ID100	QD100	Y100	Kp : QD106 Ki : QD107 Kd : QD108 Diff : QD109	Kp : QD110 Ki : QD111 Kd : QD112 Diff : QD113
1CH	ID101	QD101	Y101		
2CH	ID102	QD102	Y102		
3CH	ID103	QD103	Y103		
4CH	ID104	QD104	Y104		
5CH	ID105	QD105	Y105		

XC-E6TCA-P

RELATIVE PARAMETERS	COMMENTS AND DESCRIPTIONS				
	CH	Ch0	Ch1		Ch5
Display temperature (unit: 0.1)	module 1	ID100	ID101	ID10×	ID105
PID output (X input which returns to main unit)	module 1	X100	X101	X10×	X105
Thermocouple's connecting status (0 is connect, 1 is disconnect)	module 1	X110	X111	X11×	X115
PID auto tune error bit (0 is normal, 1 is parameters error)	module 1	X120	X121	X12×	X125
Enable channel's signal	module 1	Y100	Y101	Y10×	Y105
Auto tune PID control bit	Auto tune activate signal, enter auto tune stage if being set to be 1; when auto turn finish, PID parameters and temperature control cycle value are refreshed, reset this bit automatically. Users can also read its status; 1 represents auto tune processing; 0 represents no auto tune or auto tune finished				
PID output value (operation value)	Digital output value range: 0 ~ 4095 If PID output is analogue control (like steam valve open scale or thyistor ON angle), transfer this value to the analogue output module to realize the control requirements				
PID parameters (P、I、D)	Via PID auto tune to get the best parameters; If the current PID control can't fulfill the control requirements, users can also write the PID parameters according to experience. Modules carry on PID control according to the set PID parameters.				
PID operation range (Diff) (unit: 0.1)	PID operation activates between $\pm \text{Diff}$ range. In real temperature control environments, if the temperature is lower than $T_{\text{set temp.}} - T_{\text{Diff}}$, PID output the max value; if the temperature is higher than $T_{\text{set temp.}} + T_{\text{Diff}}$, PID output the mini value;				

Temperature difference (unit: 0.1)	(sample temperature+ Temperature difference)/10=display temperature value. Then temperature display value can equal or close to the real temperature value. This parameter has sign (negative or positive). Unit is 0.1 , the default value is 0.
The set temperature value(unit: 0.1)	Control system's target temperature value. The range is 0 ~ 1000 , the precision is 0.1 .
Temperature control cycle (unit: 0.1s)	Control cycle's range is 0.5s ~ 200s, the minimum precision is 0.1s. the write value is the real temperature control cycle multiply 10. i.e. 0.5s control cycle should write 5, 200s control cycle should write 2000.
Adjust environment temperature value (unit: 0.1)	<p>If users think the environment temperature is different with the display temperature, he can write in the known temperature value. At the moment of value written in, calculate the temperature difference and save.</p> <p>Calculate the temperature difference value =adjust environment temperature value - sample temperature value. Unit: 0.1 .</p> <p>E.g.: under heat balance status, user test the environmental temperature as 60.0 with mercurial thermometer, the display temperature is 55.0 (correspond sample temperature is 550), temperature difference =0. at this time, users write this parameters with 600 , temperature difference is re-calculated to be 50 (5), then the display temperature = (sample temperature + temperature difference) /10 =60 .</p> <p>**Note: when users write the adjust temperature value, make sure that the temperature is same with the environment temperature value. This value is very important, once it's wrong, temperature difference will be wrong, then effect the display temperature</p>
Auto tune output value	The output when auto tune, use % as the unit, 100 represents 100% of full scale output. 80 represents 80% of full scale output.

XC-E3AD4PT2DA

CH Nr.	AD signal	PID output value	PID run/stop bit	Set value	PID parameters: Kp 、 Ki 、 Kd 、 control range Diff 、 death range Death
0CH	ID100	ID107	Y100	QD102	Kp ----- QD109 Ki ----- QD110 Kd ----- QD111 Diff ----- QD112 Death ---- QD113
1CH	ID101	ID108	Y101	QD103	
2CH	ID102	ID109	Y102	QD104	
CH Nr.	PT signal	PID output value	PID run/stop bit	Set value	
3CH	ID103	ID110	Y103	QD105	
4CH	ID104	ID111	Y104	QD106	
5CH	ID105	ID112	Y105	QD107	
6CH	ID106	ID113	Y106	QD108	
CH Nr.	DA signal	-	-	-	-
0CH	QD100	-	-	-	-

1CH	QD101	-	-	-	
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XC-E2AD2PT2DA

RELATIVE PARAMETERS	COMMENTS AND DESCRIPTIONS				
	CH	PT0 (0.01)	PT1 (0.01)	AD0	AD1
Display temperature (unit: 0.1)	module 1	ID100	ID101	ID102	ID103
PID output (X input which returns to main unit)	module 1	X100	X101	X102	X103
Connecting status (0 is connect, 1 is disconnect)	module 1	X110	X111	X112	X113
PID auto tune error bit (0 is normal, 1 is parameters error)	module 1	X120	X121	X122	X123
Enable channel's signal	module 1	Y100	Y101	Y102	Y103
Auto tune PID control bit	Auto tune activate signal, enter auto tune stage if being set to be 1; when auto turn finish, PID parameters and temperature control cycle value are refreshed, reset this bit automatically. Users can also read its status; 1 represents auto tune processing; 0 represents no atto tune or auto tune finished				
PID output value (operation value)	Digital output value range: 0 ~ 4095 If PID output is analogue control (like steam valve open scale or thyistor ON angle), transfer this value to the analogue output module to realize the control requirements				
PID parameters (P、I、 D)	Via PID auto tune to get the best parameters; If the current PID control can't fulfill the control requirements, users can also write the PID parameters according to experience. Modules carry on PID control according to the set PID parameters.				
PID operation range (Diff) (unit: 0.1)	PID operation activates between $\pm \text{Diff}$ range. In real temperature control environments, if the temperature is lower than $T_{\text{set temp.}} - T_{\text{Diff}}$, PID output the max value; if the temperature is higher than $T_{\text{set temp.}} + T_{\text{Diff}}$, PID output the mini value;				
Temperature difference (unit: 0.1)	(sample temperature+ Temperature difference)/10=display temperature value. Then temperature display value can equal or close to the real temperature value. This parameter has sign (negative or positive). Unit is 0.1 , the default value is 0.				
The set temperature value(unit: 0.1)	Control system's target temperature value. The range is 0 ~ 1000 , the precision is 0.1 .				

Temperature control cycle (unit: 0.1s)	Control cycle's range is 0.5s ~ 200s, the minimum precision is 0.1s. the write value is the real temperature control cycle multiply 10. i.e. 0.5s control cycle should write 5, 200s control cycle should write 2000.
Real value (unit: 0.1)	<p>If users think the environment temperature is different with the display temperature, he can write in the known temperature value. At the moment of value written in, calculate the temperature difference and save.</p> <p>Calculate the temperature difference value =adjust environment temperature value - sample temperature value. Unit: 0.1 .</p> <p>E.g.: under heat balance status, user test the environmental temperature as 60.0 with mercurial thermometer, the display temperature is 55.0 (correspond sample temperature is 550), temperature difference =0. at this time, users write this parameters with 600 , temperature difference is re-calculated to be 50 (5), then the display temperature = (sample temperature + temperature difference) /10 =60 .</p> <p>**Note: when users write the adjust temperature value, make sure that the temperature is same with the environment temperature value. This value is very important, once it's wrong, temperature difference will be wrong, then effect the display temperature</p>
Auto tune output value	The output when auto tune, use % as the unit, 100 represents 100% of full scale output. 80 represents 80% of full scale output.

Appendix 1-4 . Special Flash Register List

1、 I filter

ID	Function	Initial Value	Description
FD8000	input filter time of X port	10	Unit: ms
FD8002		0	
FD8003		0	
.....		0	
FD8009		0	

2、 I mapping

ID	Function	Initial value	Description
FD8010	X00 corresponds with I**	0	X0 corresponds with number of input image I**
FD8011	X01 corresponds with I**	1	Initial values are all decimal
FD8012	X02 corresponds with I**	2	
.....		
FD8073	X77 corresponds with I**	63	

3、 O mapping

ID	Function	Initial value	Description
FD8074	Y00 corresponds with I**	0	Y0 corresponds with the number of output image O**

FD8075	Y01 corresponds with I**	1	Initial value are all decimal
FD8076	Y02 corresponds with I**	2	
.....		
FD8137	Y77 corresponds with I**	63	

4、 I property

ID	function	Initial value	Description
FD8138	X00 property	all be 0	0: positive logic; others: negative logic
FD8139	X01 property		
FD8140	X02 property		
.....		
FD8201	X77 property		

5、 power-off retentive area of soft components

ID	Function	Initial Value
FD8202	Start tag of D power off retentive area	4000
FD8203	Start tag of M power off retentive area	3000
FD8204	Start tag of T power off retentive area	640
FD8205	Start tag of C power off retentive area	320
FD8206	Start tag of S power off retentive area	512
FD8207	Start tag of ED power off retentive area	0
FD8209	Pulse director and pulse delay time setting	50ms

6、 Communication

COM1	ID	Function	Initial	Description
	FD8210	Communicate Mode (station number)	1	255 (FF) is free mode , 1~254 is modbus station number
	FD8211	Communicate format	8710	Baud rate, Data bit, stop bit, parity
	FD8212	Judgment time of ASC timeout	3	Unit ms, if set to be 0, it means no timeout waiting
	FD8213	Judgment time of reply timeout	300	Unit ms, if set to be 0, it means no timeout waiting
	FD8214	Start ASC	0	High 8 bits invalid
	FD8215	End ASC	0	High 8 bits invalid
	FD8216	Free format setting	0	8/16 bits buffer; With/without start bit , With/without stop bit
COM2	FD8220	Communicate Mode (station number)	8710	255 (FF) is free mode , 1~254 is modbus station number
	FD8221	Communicate format	3	Baud rate, Data bit, stop bit, parity

	FD8222	Judgment time of ASC timeout	300	Unit ms, if set to be 0, it means no timeout waiting
	FD8223	Judgment time of reply timeout	0	Unit ms, if set to be 0, it means no timeout waiting
	FD8224	Start ASC	0	High 8 bits invalid
	FD8225	End ASC	0	High 8 bits invalid
	FD8226	Free format setting	8710	8/16 bits buffer; With/without start bit , With/without stop bit
COM3	FD8230	Communicate Mode (station number)	8710	255 (FF) is free mode , 1~254 is modbus station number
	FD8231	Communicate format	3	Baud rate, Data bit, stop bit, parity
	FD8232	Judgment time of ASC timeout	300	Unit ms, if set to be 0, it means no timeout waiting
	FD8233	Judgment time of reply timeout	0	Unit ms, if set to be 0, it means no timeout waiting
	FD8234	Start ASC	0	High 8 bits invalid
	FD8235	End ASC	0	High 8 bits invalid
	FD8236	Free format setting	8710	8/16 bits buffer; With/without start bit , With/without stop bit

7、 Subsection Power-off Retentive Zone of Timer T

Nr.	Function	Initial Value
FD8323	Set the retentive zone's start tag of 100ms non-accumulation timer	
FD8324	Set the retentive zone's start tag of 100ms accumulation timer	
FD8325	Set the retentive zone's start tag of 10ms non-accumulation timer	
FD8326	Set the retentive zone's start tag of 10ms accumulation timer	
FD8327	Set the retentive zone's start tag of 1ms non-accumulation timer	
FD8328	Set the retentive zone's start tag of 1ms accumulation timer	
FD8329	Set the retentive zone's start tag of 1ms precise timer	

8、 Subsection power-off retentive zone of counter C

Nr.	Function	Initial Value
FD8330	Set the retentive zone's start tag of 16 bits positive counter	
FD8331	Set the retentive zone's start tag of 32 bits positive/negative counter	
FD8332	Set the retentive zone's start tag of single-phase HSC	
FD8333	Set the retentive zone's start tag of dual-phase HSC	
FD8334	Set the retentive zone's start tag of AB-phase HSC	

1 : If you change special FLASH memory, it will take into effect after restart the PLC

Appendix 2 Instructions List

In this chapter, we will list all the instructions XC series PLC support. These instructions include: basic instructions, application instructions, special function instructions and motion control instructions. Also, we declare each instruction's application range.

This part enables the users to check the instruction's functions much faster. For the detailed application, please refer to 《XC Series Programmable Controller 【Instruction Part】》.

Appendix 2-1 . Basic Instructions List
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Appendix 2-2 . Application Instructions List
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Appendix 2-3 . Special Function Instructions List

Appendix 2-4 . Motion Control Instructions List

Appendix 2-1 . Basic Instructions List

Mnemonic	Function
LD	Initial logical operation contact type NO (normally open)
LDI	Initial logical operation contact type NC (normally closed)
OUT	Final logic operation type coil drive
AND	Serial connection of NO
ANI	Serial connection of NC
OR	Parallel connection of NO
ORI	Parallel connection of NC
LDP	Rising edge pulse
LDF	Falling edge pulse
ANDP	Serial connection of rising edge pulse
ANDF	Serial connection of falling edge pulse
ORP	Parallel connection of rising edge pulse
ORF	Parallel connection of falling edge pulse
LDD	Read the point
LDDI	Read NC
ANDD	Read the point and serial connection
ANDDI	Read NC and serial connection
ORD	Read the point and parallel connection
ORDI	Read NC and parallel connection
OUTD	Output the point
ORB	Parallel connection of parallel multiply parallel circuit
ANB	Serial connection of parallel multiply parallel circuit
MCS	New bus line start
MCR	Bus line return
ALT	Alternate state
PLS	Rising edge pulse
PLF	Falling edge pulse
SET	Set a bit device permanently on
RST	Reset a bit device permanently off
OUT	Output counter coil
RST	Output reset, and current data reset to zero
END	I/O process and return to step0
GROUP	Instruction block fold start
GROUPE	Instruction block fold end
TMR	Time

Appendix 2-2 . Applied instruction list

Sort	Mnemonic	Function	Suit Model				
			XC1	XC2	XC3	XC5	XCM
Program flow	CJ	Condition Jump					
	CALL	Call subroutine					
	SRET	Subroutine return					
	STL	Flow start					
	STLE	Flow end					
	SET	Open the assigned flow, close the current flow					
	ST	Open the assigned flow, not close the current flow					
	FOR	Start of a FOR-NEXT loop					
	NEXT	END of a FOR-NEXT loop					
	FEND	End of main program					
Data compare	LD= ¹	LD activate if (S1)= (S2)					
	LD> ¹	LD activate if (S1)> (S2)					
	LD< ¹	LD activate if (S1)< (S2)					
	LD<> ¹	LD activate if(S1) (S2)					
	LD>= ¹	LD activate if(S1) >= (S2)					
	LD<= ¹	LD activate if(S1) <= (S2)					
	AND= ¹	AND activate if (S1)= (S2)					
	AND> ¹	AND activate if (S1)> (S2)					
	AND< ¹	AND activate if (S1)< (S2)					
	AND<> ¹	AND activate if(S1) (S2)					
	AND>= ¹	AND activate if(S1) >= (S2)					
	AND<= ¹	AND activate if(S1) <= (S2)					
	OR= ¹	OR activate if (S1)= (S2)					
	OR> ¹	OR activate if (S1)> (S2)					
	OR< ¹	OR activate if (S1)< (S2)					
	OR<> ¹	OR activate if(S1) (S2)					
	OR>= ¹	OR activate if(S1) >= (S2)					
	OR<= ¹	OR activate if(S1) <= (S2)					
Data move	CMP ¹	Data compare					
	ZCP ¹	Data zone compare					
	MOV ¹	Move					
	BMOV	Block move					
	FMOV ¹	Fill move					
	FWRT ¹	FlashROM Written					
	MSET	Zone set					
	ZRST	Zone reset					
	SWAP	The high bytes and low bytes exchange					
	XCH ¹	Data exchange					
Sort	Mnemonic	function	Suit model				
			XC1	XC2	XC3	XC5	XCM
Data Operation	ADD ¹	addition					
	SUB ¹	subtraction					
	MUL ¹	multiplication					
	DIV ¹	division					
	INC ¹	Increment					
	DEC ¹	decrement					
	MEAN ¹	mean					
	WAND ¹	Word and					
	WOR ¹	Word or					
	WXOR ¹	Word exclusive or					
	CML ¹	Complement					
	NEG ¹	Negative					
Data shift	SHL ¹	Arithmetic shift left					
	SHR ¹	Arithmetic shift right					

	LSL ¹	Logic shift left					
	LSR ¹	Logic shift right					
	ROL ¹	Rotation shift left					
	ROR ¹	Rotation shift right					
	SFTL ¹	Bit shift left					
	SFTR ¹	Bit shift right					
	WSFL	Word shift left					
	WSFR	Word shift right					
Data convert	WTD	Single word integer convert to double word integer					
	FLT ¹	16 bits integer convert to float					
	FLTD ¹	64 bits integer convert to float					
	INT ¹	Float convert to integer					
	BIN	BCD convert to binary					
	BCD	Binary convert to BCD					
	ASCI	Hex convert to ASC					
	HEX	ASC convert to Hex					
	DECO	Coding					
	ENCO	High bit coding					
	ENCOL	Low bit coding					

Sort	Mnemonic	function	Suit Model				
			XC1	XC2	XC3	XC5	XCM
Float Operation	ECMP ²	Float compare					
	EZCP ²	Float zone compare					
	EADD ²	Float addition					
	ESUB ²	Float subtraction					
	EMUL ²	Float multiplication					
	EDIV ²	Float division					
	ESQR ²	Float square root					
	SIN ²	Sine					
	COS ²	Cosine					
	TAN ²	tangent					
	ASIN ²	Float arcsin					
	ACOS ²	Float arccos					
	ATAN ²	Float arctan					
Clock	TRD	Read RTC data					
	TWR	Set RTC data					

1 : All the instructions are 16bits except the instructions with 1 which has 32bits. 32bits instructions are added D in front of its 16bits instruction. Such as ADD(16bits) / DADD(32bits).

2: These instructions are 32bits, and have no 16bits format.

3: means this series support the instruction.

Appendix 2-3 . Special Instructions List

Sort	Mnemonic	Function	Suitable type				
			XC1	XC2	XC3	XC5	XCM
pulse	PLSY ¹	Single segment no accelerate/decelerate pulse output					
	PLSR ¹	Relative position multi-segment pulse control					
	PLSF ¹	Changeable frequency pulse output					
	PLSA ¹	Absolute position multi-segment pulse control					
	PLSNEXT/ PLSNT	change the pulse segment					
	PLSMV ²	Save the pulse number in the register					
	STOP	Pulse stop					
High Speed Counter (HSC)	HSCR ²	Read high speed counter value					
	HSCW ²	Write high speed counter value					
MODBUS communication	COLR	MODBUS coil read					
	INPR	MODBUS input coil read					
	COLW	MODBUS single coil write					
	MCLW	MODBUS multi coil write					
	REGR	MODBUS register read					
	INRR	MODBUS input register write					
	REGW	MODBUS single register write					
	MRGW	MODBUS multi register write					
Free format communication	SEND	Free format data send					
	RCV	Free format data receive					
CANBUS communication	CCOLR	CANBUS coil read					
	CCOLW	CANBUS coil write					
	CREGR	CANBUS register read					
	CREGW	CANBUS register write					
Precision time	STR	Precision time					
	STRR	Read precision time register					
	STRS	Stop precision time					
interrupt	EI	Enable interruption					
	DI	Disable interruption					
	IRET	Interruption return					
BLOCK	BSTOP	Stop the block					
	BGOON	Continue running the block					
	WAIT	Wait					
Read/write expansion	FROM	Read the module					
	TO	Write the module					
others	FRQM	Frequency measurement					
	PWM	Pulse width modulation					
	PID	PID control					

1 : All the instructions are 16bits except the instructions with 1 which has 32bits. 32bits instructions are added D in front of its 16bits instruction. Such as ADD(16bits) / DADD(32bits).

2: These instructions are 32bits, and have no 16bits format.

3: means this series support the instruction.

Appendix 2-4 . MOTION CONTROL INSTRUCTIONS LIST

Mnemonic	FUNCTION	SUITABLE MODELS				
		XC1	XC2	XC3	XC5	XCM
ZRN ¹	Origin return					
DRVA ¹	Absolute position					
DRVI ¹	Relative position					
ABS	Absolute address					
CCW ²	Circular anticlockwise interpolation					
CHK	Servo end check					
CW ²	Circular clockwise interpolation					
DRV ²	High speed					
DRVR	Electrical zero return					
DRVZ	Machine zero return					
FOLLOW ²	Follow movement instruction					
INC	Incremental address					
LIN ²	Linear interpolation positioning					
PLAN ²	Plane selection					
TIM ²	Delayed time					
SETR	Set electrical zero					
SETP ²	Set reference frame					

1: The instructions with 1 sign have 32 bits form; generally 32 bits instructions are represented as adding D before 16 bits instructions, like this 32 bits ADD instructions is DADD;

2: The instructions with 2 sign are 32 bits form; they don't have 16 bits form;

Appendix 3 Version for special function

Generally, the functions and instructions described in this manual don't have software and hardware requirements. But for some special functions, we have software and hardware versions requirement. Below, we list these requirements for the special functions;

function	Hardware version	Software version
Fill move 32 bits instruction DFMOV	V3.0 and above	V3.0 and above
Anti-trigonometric Operation	V3.0 and above	V3.0 and above
Read/write clock	V2.51 and above	V3.0 and above
Read/write high speed counter	V3.1c and above	V3.0 and above
Interrupt high speed counter	V3.1c and above	V3.0 and above
Read precise time	V3.0e and above	V3.0 and above
Stop precise time	V3.0e and above	V3.0 and above
C program block function	V3.0c and above	V3.0 and above
PID function	V3.0 and above	V3.0 and above
Block	V3.1i and above	V3.1h and above
Connect T-BOX	V3.0g and above	V3.0 and above
Connect G-BOX	V3.0i and above	V3.0 and above
Read/write XC-E6TCA-P、XC-E2AD2PT3DA、XC-E2AD2PT2DA	V3.1f and above	V3.1b and above
Expand register ED	V3.0 and above	V3.0 and above

Appendix 4 PLC Configuration List

This part is used to check each model's configurations. Via this table, we can judge the model easily;

selectable		×Not support			support						
Models	clock	communication			expansion	BD board	NO. of high speed counter			No. of Pulse (T model/ RT model)	External interrupt
		CAN	Modbus	Free			Increase	Pulse + director	AB phase		
XC1 Series											
XC1-10	×	×	×	×	×	×	×	×	×	×	×
XC1-16	×	×	×	×	×	×	×	×	×	×	×
XC1-24	×	×	2	×	×	×	×	×	×	×	×
XC1-32	×	×	2	×	×	×	×	×	×	×	×
XC2 Series											
XC2-14		×			×	×	5	2	2	2	3
XC2-16		×	×	×	×	×	5	2	2	2	3
XC2-24		×			×		5	2	2	2 ¹	3
XC2-32		×			×		5	2	2	2 ¹	3
XC2-48		×			×		5	2	2	2 ¹	3
XC2-60		×			×		5	2	2	2 ¹	3
XC3 Series											
XC3-14	×	×			×	×	4	2	2	2	1
XC3-24		×					6	3	3	2 ¹	3
XC3-32		×					6	3	3	2 ¹	3
XC3-48		×					4	2	2	2	3
XC3-60		×					4	2	2	2	3
XC3-19A R-E		×			×	×	4	2	2	2	3
XC5 Series											
XC5-24		×					2	1	1	4 ¹	5
XC5-32		×					2	1	1	4 ¹	5
XC5-48							6	3	3	2 ¹	3
XC5-60							6	3	3	2 ¹	3
XCM Series											
XCM-24		×					2	1	1	4 ¹	5
XCM-32		×					2	1	1	4 ¹	5

1 : If use BD board , Y1 can't be used for pulse

2 : it just can be used for Modbus slave.

Appendix 5 common question A&Q

The following are the common questions may happen when using the PLC.

Q1 : why the coil is not set when the condition is satisfied?

A1 : the probable reasons:

- (1) use one coil for many times, double coils output, the later coil has priority.
- (2) some conditions reset the coil, please use monitor function to find the reset point and modify the program.

Q2 : set on the pulse output instruction, the pulse doesn't output?

A2 : there are many pulse output instructions in the program.

Q3 : why connect the high speed counter but no counter value?

A3 : the probable reasons:

- (1) make sure the PLC has high speed counter photo-couplers.
- (2) when the PLC hardware version is 2.5 and software version is 3.0, it is not available to use HSC, please update the hardware version to 3.0.

Q4 : What's the difference between com1 and com2?

A4 : the communication parameters of com1 and com2 can set by users. The difference is com1 can return to default parameters by stop PLC after power on.

Q5 : Why free format communication is failure?

A5 : check the communication parameters, if use com2, please set the FD8220 to HFF, FD8221 set to corresponding parameters.

Q6 : why the real time clock(RTC) can not work?

A6 : XC3-14 and XP1 do not have RTC function.

Q7 : why PLC can not communicate with other device?

A7 : the probable reasons:

- (1) communication parameters: PLC com port and device parameters must be the same.
- (2) communication cable: connection correct and good.
- (3) communication serial port: check the serial port, download the PLC program, if download successful the serial port is no problem.
- (4) ask manufacturer for help.

Q8 : how long can the PLC battery be used?

A8 : for 3-5 years.

Q9 : why the temperature fluctuates serious under normal temperature when connecting the thermocouple with the temperature module?

A9 : the probable reasons:

(1) check if the thermocouple cold point is short with the outside cover. If short, please change another thermocouple.

(2) the weak electricity such as outside interference, thermocouple, temperature module should separate from the strong electricity, make sure there is certain distance between them. If the device has motor, inverter, make sure to connect the ground correctly.

