

# **LINUX CNC APPLICATION MANUAL**

## **(32 AXES) V.37**

<b>Table of Content</b> .....	7
1. C/S/Reg Illustration .....	9
1.1. PLC/HMI & NC Kernel Interface (R10,000~R28,999) .....	11
1.1.1. System.....	11
RESET .....	11
Action Signal of System .....	12
Action Mode of System .....	12
Alarm & Warning .....	12
REMOTE IO Error Detection.....	13
Editing Protection Function .....	13
Using Expired Date Function .....	13
Time Counting Function .....	13
Electric CAM Logic Output Function .....	13
Analog Voltage Output Function .....	14
Analog Voltage Detection Function.....	15
Cutting Line Velocity Caculation Function .....	15
1.1.2. Path .....	16
Mode of Path.....	16
Action Signal of Path.....	16
Action Mode of Path.....	17
Block Skip of Path .....	18
Override Control.....	18
Status of Path .....	18
Program File Name of Path .....	19
MST Code.....	19
Program Restart .....	20
MPG Dry Run.....	21
MDI Control .....	21
Insert Selection MACRO Control .....	22
Clear Accumulating Program Running Time .....	22
M99 Appears Signal .....	22
Machining Working Piece Counting Function .....	22
Moving Single Block Data Block.....	23
Manually Return .....	24
SCARA World Coordinate Direction JOG Function .....	24

1.1.3. Axis .....	25
Axis Use or NOT .....	25
EMG .....	25
RESET .....	25
Axis Mode Switch .....	26
Axis Moving Status .....	26
Home Return.....	26
Alarm & Warning .....	27
Hardware Limit.....	27
JOG Function.....	28
Positioning Function.....	28
Velocity Function.....	30
MPG Position Function .....	31
Software Limit Function.....	32
Disconnecting Checking Function.....	32
Axis Command and Feedback Exceed Max. Tolerance Value Function.....	32
Axis if Return Home Position Finish and Machine Coordinate is Zero Function.....	33
Axis Machine Coordinate Information.....	33
Axis Command and Feedback Error Offset Information.....	33
Axis Synchronized Follow Control Function .....	33
Axis Pitch Error Offset Update Function .....	34
Axis Encoder Value Information .....	34
Axis Machine Lock Function .....	34
Axis Ignore Input Command Function .....	35
Electric CAM Function.....	36
Axis Servo ON/OFF Function .....	36

1.2. PLC/HMI & NC Interface (Public Interface, Nothing to do with Projects-R29,000~R29,999) ..37

# 1. C/S/Reg Illustration

## C/S bit

Range	Size	Description	Saved
C0~C4095	4096	PLC/HMI Core	No
S0~S4095	4096	Core PLC/HMI	No

## Register

Range	Size	Description	Saved
R0~R6999	7000	Provide to PLC	No
R7000~R7899	900	Provide to PLC (Tool Magazine)	Yes
R7900~R7999	100	Provide to PLC (Tool Magazine)	No
R8000~R9999	2000	Provide to PLC (Parameters or Record Value)	Yes
R10,000~R28,999	19000	PLC/HMI & Core Interface	No
R29,000~R29,999	1000	PLC/HMI & Core Interface (Public Interface)	No

## Tool Magazine

Range	Size	Description
R7000~R7399	400	400 Sets Tool Pocket
R7400~R7799	400	400 Sets Tool Status
R7800	1	Tool Magazine Quantity(Max. 6 PCS)
R7801	1	1 <sup>st</sup> Tool Magazine Quantity
R7802	1	2 <sup>nd</sup> Tool Magazine Quantity
R7803	1	3 <sup>rd</sup> Tool Magazine Quantity
R7804	1	4 <sup>th</sup> Tool Magazine Quantity
R7805	1	5 <sup>th</sup> Tool Magazine Quantity
R7806	1	6 <sup>th</sup> Tool Magazine Quantity
R7807	1	1 <sup>st</sup> Tool Magazine Tool Pocket Beginning R No.
R7808	1	2 <sup>nd</sup> Tool Magazine Tool Pocket Beginning R No.
R7809	1	3 <sup>rd</sup> Tool Magazine Tool Pocket Beginning R No.
R7810	1	4 <sup>th</sup> Tool Magazine Tool Pocket Beginning R No.
R7811	1	5 <sup>th</sup> Tool Magazine Tool Pocket Beginning R No.

R7812	1	6 <sup>th</sup> Tool Magazine Tool Pocket Beginning R No.
R7813	1	1 <sup>st</sup> Tool Magazine Spindle Tool No.
R7814	1	2 <sup>nd</sup> Tool Magazine Spindle Tool No.
R7815	1	3 <sup>rd</sup> Tool Magazine Spindle Tool No.
R7816	1	4 <sup>th</sup> Tool Magazine Spindle Tool No.
R7817	1	5 <sup>th</sup> Tool Magazine Spindle Tool No.
R7818	1	6 <sup>th</sup> Tool Magazine Spindle Tool No.
R7819	1	1 <sup>st</sup> Tool Magazine Spindle Tool Status
R7820	1	2 <sup>nd</sup> Tool Magazine Spindle Tool Status
R7821	1	3 <sup>rd</sup> Tool Magazine Spindle Tool Status
R7822	1	4 <sup>th</sup> Tool Magazine Spindle Tool Status
R7823	1	5 <sup>th</sup> Tool Magazine Spindle Tool Status
R7824	1	6 <sup>th</sup> Tool Magazine Spindle Tool Status
R7825	1	1 <sup>st</sup> Tool Magazine Standby Tool Pocket
R7826	1	2 <sup>nd</sup> Tool Magazine Standby Tool Pocket
R7827	1	3 <sup>rd</sup> Tool Magazine Standby Tool Pocket
R7828	1	4 <sup>th</sup> Tool Magazine Standby Tool Pocket
R7829	1	5 <sup>th</sup> Tool Magazine Standby Tool Pocket
R7830	1	6 <sup>th</sup> Tool Magazine Standby Tool Pocket
Below Data <b>Not Saving</b>		
R7900	1	PLC Command
R7901	1	1 <sup>st</sup> Tool Magazine Standby Tool No.
R7902	1	2 <sup>nd</sup> Tool Magazine Standby Tool No.
R7903	1	3 <sup>rd</sup> Tool Magazine Standby Tool No.
R7904	1	4 <sup>th</sup> Tool Magazine Standby Tool No.
R7905	1	5 <sup>th</sup> Tool Magazine Standby Tool No.
R7906	1	6 <sup>th</sup> Tool Magazine Standby Tool No.

## PLC Parameters (User Parameters)

Range	Size	Description
R8000~R8049	50	Switch Category (Total: 50x32=1600 PCS)
R8050~R9999	1950	Numerical Category

# 1.1. PLC/HMI & NC Kernel Interface (R10,000~R28,999)

There are three big categories for NC kernel to outer interface.

- PLC through C/S/ Reg communicate with the kernel
- HMI through KI library saving C/S/Reg communicate with the kernel
- Remote PC through ReCON saving C/S/Reg communicate with the kernel

Control Signal Divided to Three Categories:

- System – System controls signal, very unique. For example, system alarm means there are alarms happening for each big module.
- Path – Control signal related to 1~6 path, for example, cycle start signal for 1~6 path.
- Axis –Control signal related to 1~32 path, For example, JOG (+) trigger signal for 1~32 axis.

Signal Distribution :

- R Value Distributes 500 ones for every path.
- C Bit/S Bit Distribute 500 ones for each path.

C Bit/S Bit Range	R Value Range	Description
	10000~16999	1~32 Axis
0~499	17000~17499	1 <sup>st</sup> path signal range
500~999	17500~17999	2 <sup>nd</sup> path signal range
1000~1499	18000~18499	3 <sup>rd</sup> path signal range
1500~1999	18500~18999	4 <sup>th</sup> path signal range
2000~2499	19000~19499	5 <sup>th</sup> path signal range
2500~2999	19500~19999	6 <sup>th</sup> path signal range
3000~4095		System

## 1.1.1. System

This type of signal has unique feature, mainly for PLC or HMI control or look for path type and axis type information conveniently.

### ■ RESET

C/S bit	Description	R/W	Suitable Mode
C 3000	System RESET Signal ◦ 0 : OFF , 1 : ON (When alarm occurs, you could use this function to clear alarm. DO NOT use upper trigger signal to trigger, or it won't work.)	W	P/V Mode

### ■ Action Signal of System

C/S bit	Description	R/W	Suitable Mode
C 3001	System CYCLE START Signals ◦ 0 : OFF , 1 : ON (C3001 trigger lower trigger signal , equals to trigger C0 、 C500 、 C1000 、 C1500 、 C2000 、 C2500)	W	P/V Mode
C 3002	System FEED HOLD Signal ◦ 0 : OFF , 1 : ON (C3002 trigger upper trigger signal , equals to trigger C1 、 C501 、 C1001 、 C1501 、 C2001 、 C2501)	W	P/V Mode
C 3003	System RESET Signal (Not Clear Alarm) ◦ 0 : OFF , 1 : ON (C3003 trigger upper trigger signal , equals to trigger C2 、 C502 、 C1002 、 C1502 、 C2002 、 C2502)	W	P/V Mode

### ■ Action Mode of System

C/S bit	Description	R/W	Suitable Mode
C 3005	System Path Not READY Signal ◦ 0 : OFF , 1 : ON (C3005 trigger upper trigger signal , equals to trigger C7 、 C507 、 C1007 、 C1507 、 C2007 、 C2507)	W	P/V Mode

### ■ Alarm & Warning

C/S bit	Description	R/W	Suitable Mode
S 3000	System Alarm Signal ◦ 0 : N/A , 1 : Yes	R	P/V Mode
S 3001	System Warning Signal ◦ 0 : N/A , 1 : Yes	R	P/V Mode

R Value	Description	R/W	Suitable Mode
R29000.0~ R29049.31	Trigger Alarm Function ◦ 0 : OFF , 1 : ON ◦ You can use PLC editing software to edit alarm illustration. (bit0: 1 <sup>st</sup> Set, bit1: 2 <sup>nd</sup> Set..., bit31 : 32 Set)	W	P / V Mode
R29050.0~ R29099.31	Trigger Warning Function ◦ 0 : OFF , 1 : ON ◦ You can use PLC editing software to edit warning illustration. (bit0: 1 <sup>st</sup> Set, bit1: 2 <sup>nd</sup> Set..., bit31 : 32 Set)	W	P / V Mode

## ■ REMOTE IO Error Detection

C/S bit	Description	R/W	Suitable Mode
S 3002	REMOTE 1 IO Status ◦ 0 : Normal , 1 : Error	R	P/V Mode
S 3003	REMOTE 2 IO Status ◦ 0 : Normal , 1 : Error	R	P/V Mode

## ■ Editing Protection Function

C/S bit	Description	R/W	Suitable Mode
C 3004	Enable Editing Protection Function (0:Editable, 1:Non-Editable)	W	P/V Mode
S 3004	Editing Protection Function Status (0:Editable, 1:Non-Editable)	R	P/V Mode

## ■ Using Expired Date Function

C/S bit	Description	R/W	Suitable Mode
S 3005	Using Expired Date Status (0:Within Period,1: Expired)	R	P/V Mode

## ■ Time Counting Function

R Value	Description	R/W	Suitable Mode
R28064	Time Counting Function 0:Pause ,1: Start (bit0: 1 <sup>st</sup> Set, bit1: 2 <sup>nd</sup> Set..., bit31 : 32 Set)	W	P/V Mode
R28065	Clear Time Counting 0:Not Clear ,1: Clear (bit0: 1 <sup>st</sup> Set, bit1: 2 <sup>nd</sup> Set..., bit31 : 32 Set)	W	P/V Mode
R28066	Clear Time Counting Finish 0:Not Finish,1:Finish (bit0: 1 <sup>st</sup> Set, bit1: 2 <sup>nd</sup> Set..., bit31 : 32 Set) (When clear time counting time signal is ON, and clear time counting finish signal is 1, this signal will	R	P/V Mode

	maintain only one time cycle. Next time, system will automatically be set zero.)		
R28000~ R28031	1st~32th Set Time Counting Function Value in Minute Second(ms)	R	P/V Mode
R28032~ R28063	1st~32th Set Time Counting Function Value in Hour (hour)	R	P/V Mode

## ■ Electric CAM Logic Output Function

R Value	Description	R/W	Suitable Mode
R28067	Elec. CAM Logic Output Execute ON/OFF signal ◦ 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Set, bit1: 2 <sup>nd</sup> Set..., bit31 : 32 Set)	W	P Mode
R28068	Elec. CAM Logic Output Execute ON/OFF finish signal ◦ (bit0: 1 <sup>st</sup> Set, bit1: 2 <sup>nd</sup> Set..., bit31 : 32 Set) (When elec. CAM execute ON/OFF signal is ON and elec. CAM execute ON/OFF finish signal is 1; elec. CAM execute ON/OFF signal is OFF, and elec. CAM execute ON/OFF finish signal is 0.)	R	P Mode
R28069	Elec. CAM logic output coordinate information updating ON/OFF signal ◦ 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Set, bit1: 2 <sup>nd</sup> Set..., bit31 : 32 Set) While Axis happens alarm, this function will be no working. Updating timing is only when the axis machine coordinate is zero, this function shall be working.	W	P Mode
R28070	Elec. CAM logic output coordinate information updating ON/OFF finish signal (bit0: 1 <sup>st</sup> Set, bit1: 2 <sup>nd</sup> Set..., bit31 : 32 Set) (When elec. CAM logic output coordinate data updating ON/OFF signal is ON, electric CAM logic output coordinate data updating ON/OFF finish signal is 1;Elec. Cam logic output coordinate data updating ON/OFF signal is OFF,elec.cam logic output coordinate data updating ON/OFF finish signal is 0.)	R	P Mode
R28071	Electric CAM Logic Output(0:OFF,1:ON) (bit0: 1 <sup>st</sup> Set, bit1: 2 <sup>nd</sup> Set..., bit31 : 32 Set) (If the logic output set is ON, the corresponding logic output set Bit will be 1; if the logic output set is OFF, the corresponding set Bit should be 0.)	R	P Mode

## ■ Analog Voltage Output Function

R Value	Description	R/W	Suitable Mode
R28072~R28103	1st~32th set analog voltage output command(-10000~10000 : -10.000V~10.000V) (Related parameters R069002~069033 01st~32th set analog voltage output corresponding hardware number (0 : No Use , 1~6 , 11~16 , 21~26 , 31~36 , 41~46 , 51~56))	W	P/V Mode

Example : 1<sup>st</sup> set DA output of 1~6 motion card, setting 6 sets which PLC could control output analog voltage function.

- R069002 = 1 means the 1<sup>st</sup> DA set will be output from 1<sup>st</sup> DA 1<sup>st</sup> card. PLC R value R28072 write in 10000 means there will be output 10.000V; if R value write in -10000, and there will be output -10.000V ◦
- R069003 = 2 means the 2<sup>nd</sup> DA set will be output from 2<sup>nd</sup> DA 2<sup>nd</sup> card. PLC R value R28073 write in 10000 means there will be output 10.000V; if R value write in -10000, and there will be output -10.000V ◦
- R069004 = 3 means the 3<sup>rd</sup> DA set will be output from 3<sup>rd</sup> DA 3<sup>rd</sup> card. PLC R value R28074 write in 10000 means there will be output 10.000V; if R value write in -10000, and there will be output -10.000V ◦
- R069005 = 4 means the 4<sup>th</sup> DA set will be output from 4<sup>th</sup> DA 4<sup>th</sup> card. PLC R value R28075 write in 10000 means there will be output 10.000V; if R value write in -10000, and there will be output -10.000V ◦
- R069006 = 5 means the 5<sup>th</sup> DA set will be output from 5<sup>th</sup> DA 5<sup>th</sup> card. PLC R value R28076 write in 10000 means there will be output 10.000V; if R value write in -10000, and there will be output -10.000V ◦
- R069007 = 6 means the 6<sup>th</sup> DA set will be output from 6<sup>th</sup> DA 6<sup>th</sup> card. PLC R value R28077 write in 10000 means there will be output 10.000V; if R value write in -10000, and there will be output -10.000V ◦

## ■ Analog Voltage Detection Function

R Value	Description	R/W	Suitable Mode
R28104~R28111	1st~8th set analog voltage detecting value (-10000~10000) related parameters are as below: R040145 analog voltage detecting card address (0: No Use,512~992, Default Value is 768) R040146 Enable analog voltage detecting function (0:No Use, 1~8)	R	P/V Mode

R040147~ R040154 the voltage range of 1 <sup>st</sup> ~8 <sup>th</sup> set analog voltage detection (0~8,0:-5~+5V,4:0~10V,5:0~+5V,8:-10~+10V) R040155~ R040170 min. / max. Quantification (-10000~10000) of the 1 <sup>st</sup> ~8 <sup>th</sup> set analog voltage detection.		
<p>Example : DAQ3718 Motion Card setting 1<sup>st</sup> set as analog voltage detection and then setting one set that could read outer analog voltage value(0~10V corresponding to 0~100) from PLC.</p> <p>Setting : R040145 Analog Voltage Detecting Address=768  R040146 Analog Voltage Detecting Function ON= 1  R040147 voltage range 4 of 1<sup>st</sup> set analog voltage detection  R040155 min.value 0 of 1<sup>st</sup> set analog voltage detection  R040156 max.value 100 of 1<sup>st</sup> set analog voltage detection</p>		
<ul style="list-style-type: none"> <li>● If external voltage value smaller or equal to 0V,R28104 value would be 0</li> <li>● If external voltage value larger or equal to 10V,R28104 value would be 100</li> <li>● If external voltage value equal to 5V, R28104 value would be 50</li> </ul>		

## ■ Cutting Line Velocity Calculation Function

R Value	Description	R/W	Suitable Mode
R28112~ R28117	Axis selection of the 1 <sup>st</sup> ~6 <sup>th</sup> set cutting line velocity calculation 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Set, bit1: 2 <sup>nd</sup> Set..., bit31 : 32 Set)	W	
R28118~ R28123	The 1 <sup>st</sup> ~ 6 <sup>th</sup> Set Cutting Line Velocity Value ( LU/min )	R	
<p>For Example :</p> <p>Through 2<sup>nd</sup> set cutting line velocity calculation function, using 2<sup>nd</sup> axis and 4<sup>th</sup> axis doing cutting line velocity calculation function from PLC, make R28113's bit1 and bit3 open; then 2+8 = 10 (2<sup>1</sup>+2<sup>3</sup>=10),</p> <p>We could read immediate cutting line velocity value from R28119.</p>			

### 1.1.2. Path

- Every path has **AUTO** and **MANUAL** mode.
- AUTO mode related signal is been read from INT module first and then send to MOTION to avoid sequence problem.  
MANAUL mode will not use INT module.

## ■ Mode of Path

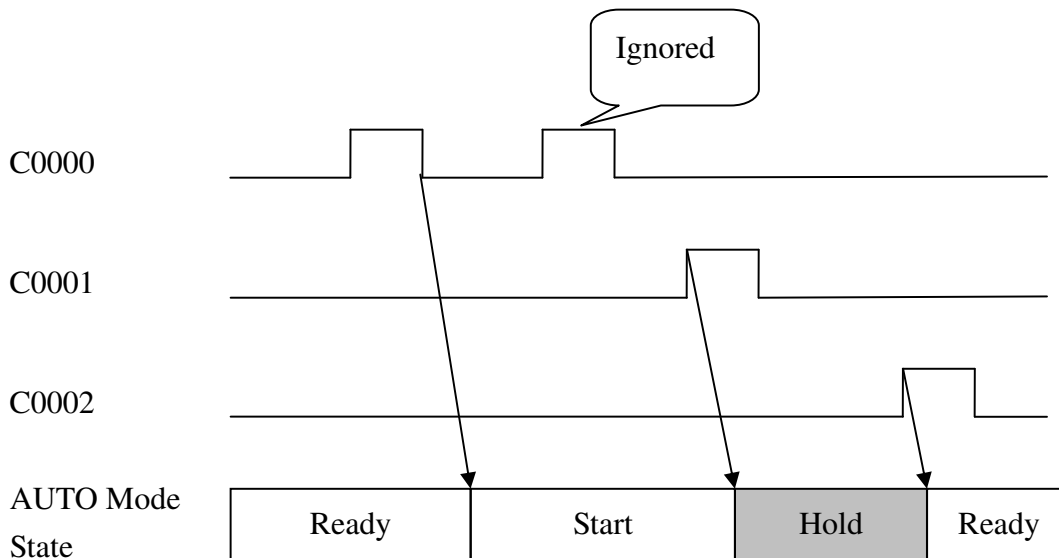
Register	Description
R17002	1 <sup>st</sup> Path Mode Select (0:Manual,1:Auto)(Only Write)
R17034	1 <sup>st</sup> Path Now Mode(0:Manual,1:Auto) (Only Read)

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

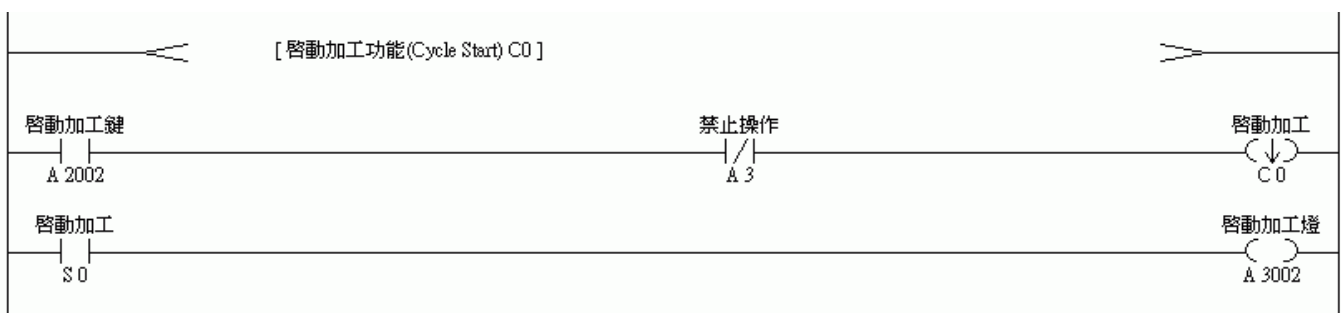
## ■ Action Signal of Path

Signal	Description
C0000	Cycle Start
C0001	Feed Hold
C0002	Reset (This function cannot clear path alarm).
S0000	Cycle Start Light
S0001	Feed Hold Light
S0002	Reset Finish

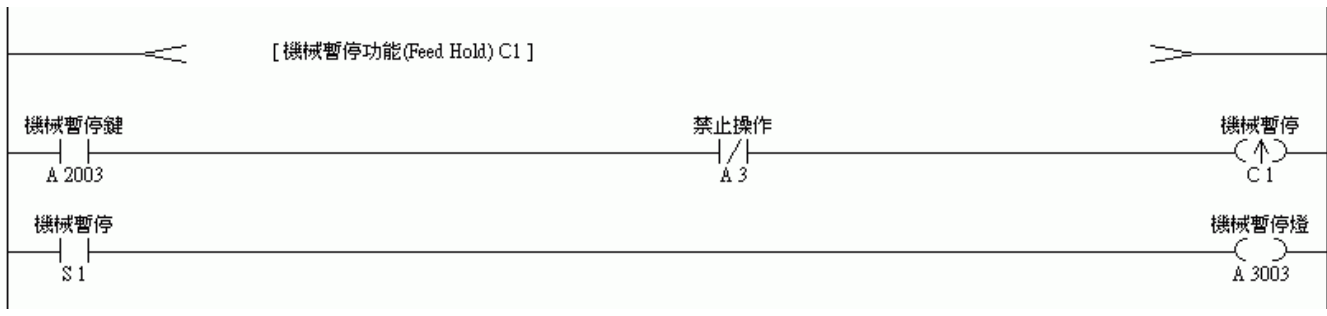
※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on



- While triggering C0000 low edge signal, the path responds S0000=ON , and get into “Cycle Start” status. PLC example as below :



- When triggering C0001 upper trigger signal, the path responds S0001=ON, and entering “Machine Feed Hold” status. PLC example as below:



## ■ Action Mode of Path

Signal	Description
C0003	Path Single Block
C0004	Path Dry Run
C0005	Path Machine Lock
C0006	MST Ignore
C0007	Path Not READY
C0008	Optional stop
S0003	Single Block Light
S0004	Dry Run Light
S0005	Machine Lock Light
S0006	MST Ignore Light
S0007	Path Not READY Light
S0008	Optional stop Light

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

## ■ Block Skip of Path

Register	Description
R17005.0	Block Skip
R17006.0	Block Skip Light

R17005.0 Use for Triggering a Slant Jumping Function

※R17005.1~ R17005.9 & R17006.1~ R17006.9 reserve to multiple sets of slant jumping function. For example: /2 /3.../9

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

## ■ Override Control

Register	Description
R17000	Rapid Positioning Speed Percentage (0.01%)
R17001	Cutting Feed Rate Percentage (0.01%)

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

## ■ Status of Path

Reg	Description
R17003	Path State(0:Not Ready,1:Ready,2:Cycle Start,3:Feed Hold,4:Block Stop)

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

Explanation :

The Machining Status of the Path

## ■ Program File Name of Path

Reg	Description
R17020	Program File Category(0:1 <sup>st</sup> CF, 1:2 <sup>nd</sup> CF, 2:USB, 3: Disk)
R17021	Program Beginning Line No.
R17022 ~ R17029	Program File Name, Total 8 Pcs of SRAM*4byte=32 byte, each R value could fill 4 digits by ASCII method, max.32 digits. Start reading from R17022 low byte. It is considered an ending if you meet a byte is zero.
R17030	Inform INT data updating signal (0: None 1: Inform Update)

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

Program Path Illustration		
Main Category Path(Environment Variable)	Program File Category	Category Illustration
HMI_MACRO_PATH Ex: /macro		Put system MACRO category
HMI_MACRO_MAKER_PATH Ex: / macro_maker		Put manufacture MACRO category
HMI_NCFILES_PATH Ex: /ncfiles	ncfiles_1	1 <sup>st</sup> :CF
	ncfiles_2	2 <sup>st</sup> :CF
	ncfiles_3	USB
	ncfile_4	Disk

## ■ MST Code

Signal	Description
S0010	Notify the PLC that 1 <sup>st</sup> M Code Read
S0011	Notify the PLC that 2 <sup>nd</sup> M Code Read
S0012	Notify the PLC that 3 <sup>rd</sup> M Code Read
S0013	Notify the PLC that 1 <sup>st</sup> S Code Read
S0023	Notify the PLC that 2 <sup>nd</sup> S Code Read
S0024	Notify the PLC that 3 <sup>rd</sup> S Code Read
S0014	Notify the PLC that T Code Read
C0010	1 <sup>st</sup> and 2 <sup>nd</sup> and 3 <sup>rd</sup> M Code Finish
C0011	None
C0012	None
C0013	1 <sup>st</sup> and 2 <sup>nd</sup> and 3 <sup>rd</sup> S Code Finish
C0023	None
C0024	None
C0014	T Code Finish

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

R Value	Description
R17010	1 <sup>st</sup> M Code Command
R17011	2 <sup>nd</sup> M Code Command
R17012	3 <sup>rd</sup> M Code Command
R17013	1 <sup>st</sup> S Code Command. EX:S1000 then R17013 = 0
R17017	2 <sup>nd</sup> S Code Command. EX:S1=2000 then R17017 = 1
R17018	3 <sup>rd</sup> S Code Command. EX:S23=3000 then R17018 = 23
R17031	1 <sup>st</sup> S Code DATA. EX:S1000 then R17031 = 1000
R17032	2 <sup>nd</sup> S Code DATA. EX:S1=2000 then R17032 = 2000
R17033	3 <sup>rd</sup> S Code DATA. EX:S23=3000 then R17033 = 3000
R17014	T Code Command

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

While the path is reading M,S,T code, M code could support 3 sets in the same line; S code could support 3 sets in the same line; T code could support 1set. Through S0010~S0014 & S0023~S0024 inform PLC and is triggered by MST code. After dealing with MST code, M code will use C0010, S code will use C0013, and T code will use C0014 inform NC that it is finishing.

## ■ Program Restart

Signal	Description
C0015	Program Restart Mode
S0015	Program Restart Mode Light

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

R Value	Description
R17007	Program Restart Method, 0: Line No., 1: Serial No., 2: Command
R17008	Program Restart Line No or Serial No.
R17009	Program Restart Status (0:None ,1:Re-Starting ,2: Finding Specific Line,-1:CANNOT Find It)

R Value	Description
R20002.0	Path 1 Program Restart Inform Signal (0: None,1: ON)
R20002.1	Path 2 Program Restart Inform Signal (0: None,1: ON)
R20002.2	Path 3 Program Restart Inform Signal (0: None,1: ON)
R20002.3	Path 4 Program Restart Inform Signal (0: None,1: ON)
R20002.4	Path 5 Program Restart Inform Signal (0: None,1: ON)

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

Sequence :

- i. Setting program restart method (R17007) and line number or serial number (R17008).
- ii. HMI enable program restart inform signal (R20002.0).
- iii. Enable Restart Mode (C0015=ON) , At this moment, system responses S0015=ON ( R10034 is 1 right now )
- iv. Enable Cycle Start Signal (C0000=ON), system responses S0000=ON means program restart begins, check R17009 =1 means restarting.
- v. When R17009 is not 0, HMI close program restart inform signal (R20002.0) ◦
- vi. Check R17009 is 2 means finding specific line, at this moment, INT shall execute **sys\_func\_prog\_restart1 or maker\_func\_prog\_restart1 program restart MACRO.**
- vii. Until program restart macro finishing, the system will go back to original program and continue to execute, at this time, R17009 will come back to 0.
- viii. If restart searching has found program ending command, program file end or alarm message, at this time, program restart will fail and R17009 value will become -1.

## ■ MPG Dry Run

R Value	Description
C0009	MPG Dry Run Signal Switch(0 : Entering MPG Dry Run , 1 : Quitting MPG Dry Run)
S0009	MPG dry run signal status (0 : Not Under MPG Dry Run 1: During MPG Dry Run)
R17015	MPG Dry Run Velocity Percentage (%)
R17016	Path MPG Dry Run Velocity Display (+: CW ,- CCW)

PLC uses R17016 to get velocity of MPG dry run, and then use this R value fill in “Rapid Positioning Speed Percentage (0.01%) (R17000)” and “Cutting Feed Rate Speed Percentage (0.01%) (R17000)” under MPG dry run; then we could use hand wheel to control program running speed OVERRIDE. Secondly, the speed of MPG dry run could be adjusted by R17016 value. When PLC activates MPG dry run function, please make C0009 ON, at this time, S0009 will be ON, too. This is mainly to inform HMI if PLC has activated MPG dry run or not.

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

## ■ MDI Control

Signal	Description
C0021	Enter MDI Mode
S0021	MDI Mode Light

From C0021 inform to enter MDI mode and trigger CYCLE START, at this moment, S0021 would be ON, and reserve original file name and line number, change to execute **sys\_func\_mdil**, wait until **sys\_func\_mdil** finish, S0021 will be OFF. Under MDI, single block and feed hold are all working. MDI function is only working at the path status (R17003) while the controller status is under Machine Ready (1) or Section Feed holds (4).

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

## ■ Insert Selection MACRO Control

Signal	Description
C0022	Enter Insert MACRO
S0022	Insert MACRO Light
R17004	Insert MACRO File Name

From C0022 inform to execute insert selection macro and trigger CYCLE START, at this moment, S0022 will be ON and reserve original program name and line number; then change to execute **maker\_func\_ins\_macro** [R17004], for example, R17004=99, therefore, Macro file name is **maker\_func\_ins\_macro99**, wait until this Macro finish, S0022 will be OFF. Under Executing insert selection MACRO function, single block and feed hold are all working. Insert selection MACRO function is only working at path status (R17003) while the controller status is under Machine Ready (1) or Section Feed hold (4). ※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

## ■ Clear Accumulating Program Running Time

Signal	Description
C0025	Clear Accumulating Program Running Time Switch 0 : NOT Clear , 1 : Clear
S0025	Clear Accumulating Program Running Time Status 0 : Not Yet Finish , 1 : Finish

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

## ■ M99 Appears Signal

Signal	Description
S0097	M99 Appears Signal 0 : No , 1 : Yes (This signal will be only ON one time cycle and then OFF.)

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

## ■ Machining Working Piece Counting Function

Signal	Description
C0026	Enable Machining Working Piece Accumulative Counting (While upper edge triggered, the working piece counting value will add 1.)
S0026	Machining Working Piece Accumulative Counting Activation Finish (0 : Wait , 1 : Finish) (While C0026 upper edge triggered, S0026 will be ON one time cycle and then OFF.)
C0027	Machining Working Piece Counting Setting as Setting Value (While upper edge triggered, machine working piece counting current value is set setting value, if you want to clear machine working piece counting value, you could make the setting value as zero,R140012~R140017 1 <sup>st</sup> ~6 <sup>th</sup> path working piece counting setting value.)
S0027	“Working Piece Counting Setting is the setting value” finish?(0 : Wait , 1 : Finish) (While C0027 upper edge triggered, S0027 will be ON for one time and OFF.)
S0098	Working Piece Counting Achieving to Target Value (0:NO,1:YES) (When working piece counting current value is larger or equals to the target value, S0098 will be ON, R140018~R140023 1 <sup>st</sup> ~6 <sup>th</sup> path working piece counting target value.)
R17019	Working Piece Counting Current Value (Read Only)

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

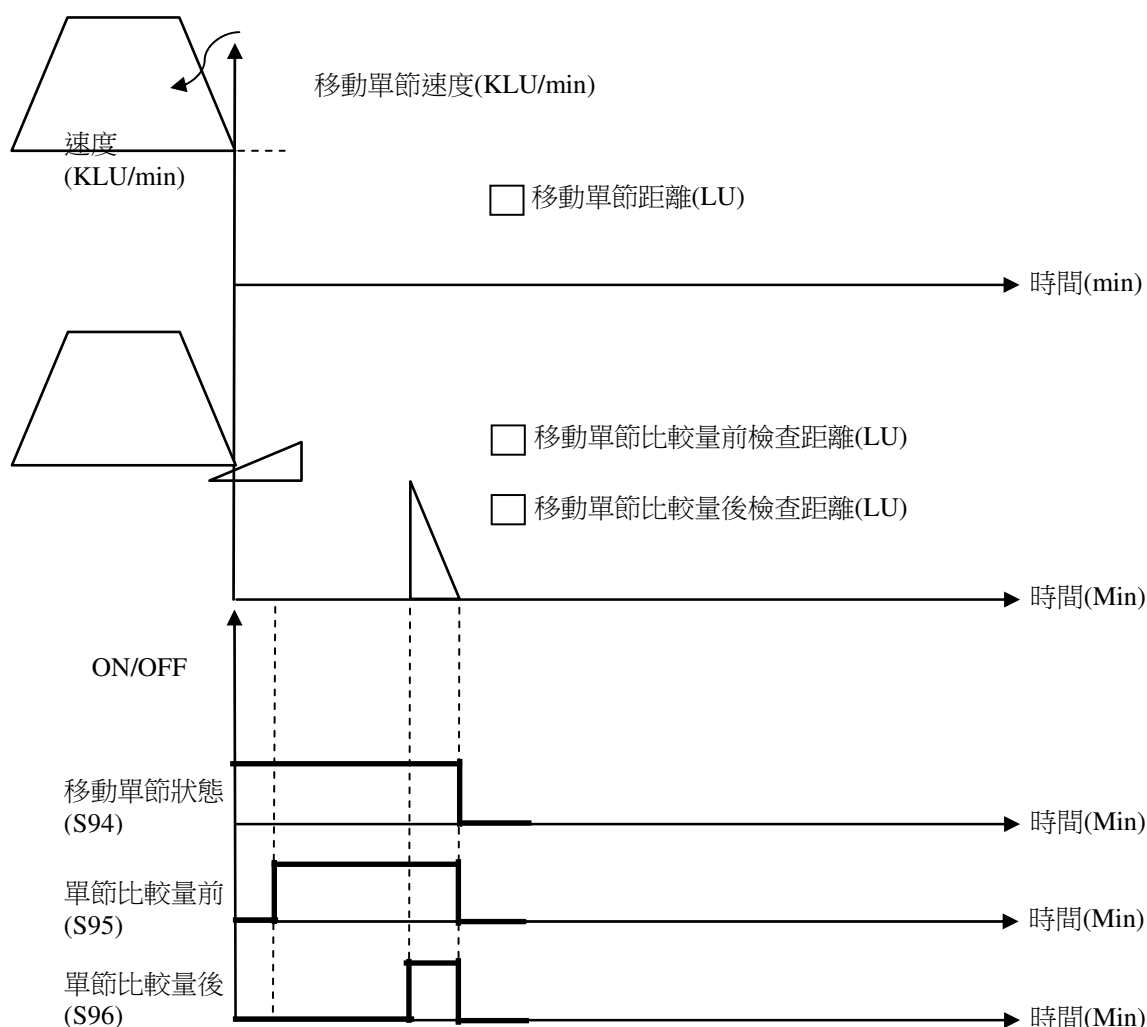
## ■ Moving Single Block Data Function

This function is only working if you turn on positioning checking function.

Signal	Description
S0094	Path Moving Single Block Status (0 : Finish , 1 : Start)
S0095	Check Finish Signal Before Path Moving Block Comparison Volume (0 : Not Finish , 1 : Finish)
S0096	After Path Moving Single Block Comparison Volume, Check Finish Signal (0 : Not Finish , 1 : Finish)

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

When moving single block data, the sequence is as follows:



## ■ Manually Return

From C0028 inform manually return function is working; normally make it ON while entering the system. After the path gets into Feed Hold or Single Block, switch to manual mode and trigger cycle start, system will execute manufacturer's Macro **maker\_func\_mr1** (second system is **maker\_func\_mr2**, and so on...) first, and then return back to the original program and continue.

## ■ SCARA World Coordinate Direction JOG Function

This function would be working only if the path system command format is set R6.

Signal	Description
C0401	SCARA World Coordinate X Direction JOG Switch (0 : OFF , 1 : ON)
C0402	SCARA World Coordinate Y Direction JOG Switch (0 : OFF , 1 : ON)
C0403	SCARA World Coordinate C Direction JOG Switch (0 : OFF , 1 : ON)
C0404	SCARA World Coordinate X Opposite Direction (0 : NO Opposite , 1 : Opposite)
C0405	SCARA World Coordinate Y Opposite Direction (0 : NO Opposite , 1 : Opposite)
C0406	SCARA World Coordinate C Opposite Direction (0 : NO Opposite , 1 : Opposite)
R17401	SCARA World Coordinate X Direction Velocity (KLU/min)
R17402	SCARA World Coordinate Y Direction Velocity (KLU/min)
R17403	SCARA World Coordinate C Direction Velocity (KLU/min)
R17404	SCARA World Coordinate X Direction Velocity Rate Percentage (0.01%)
R17405	SCARA World Coordinate Y Direction Velocity Rate Percentage (0.01%)
R17406	SCARA World Coordinate C Direction Velocity Rate Percentage (0.01%)

※ 2<sup>nd</sup> path : +500, 3<sup>rd</sup> path +1000 and so on

### 1.1.3. Axis

## ■ Axis Use or NOT

R Value	Description	R/W	Suitable Mode
R10025	Axis Use or Not 0 : N/A , 1 : Yes (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (When parameters R70000~ R70031 1st ~32st Axis corresponding hardware number have setting, this signal output is ON.)	R	P / V Mode

## ■ EMG

R Value	Description	R/W	Suitable Mode
R10000	Axis EMG Signal 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (While ON, it protects coordinates based on external encoder signal.	W	P / V Mode
R10001	EMG Signal ON/OFF Finish Signal (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (EMG Signal is ON, EMG finish signal is 1 ; while EMG signal is OFF, EMG finish signal is 0.)	R	P / V Mode

## ■ RESET

R Value	Description	R/W	Suitable Mode
R10002	Axis RESET Signal ◦ 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (While ON, the system will stop all motion of this axis but not clear axis alarm.)	W	P / V Mode
R10003	RESET Signal ON/OFF Finish Signal (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (When RESET signal is ON, RESET finish signal is 1; when signal is OFF, RESET finish signal is 0.)	R	P / V Mode

## Axis Mode Switch

R Value	Description	R/W	Suitable Mode
R10006	Axis Mode Switch Status ◦ 0 : Stop , 1 : Rotate (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	R	P / V Mode
R10021	Axis Moving Positively Status ◦ 0 : Stop or CCW , 1 : CW (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	R	P / V Mode
R10022	Axis Moving Reverse Direction Status ◦ 0 : Stop or CW , 1 : CCW (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	R	P / V Mode

## ■ Home Return

When axis has alarms, this function would not be working.

R Value	Description	R/W	Suitable Mode
R10007	Home Return ON/OFF Signal ◦ 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P Mode
R10008	Home Return ON/OFF Finish Signal ◦ (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (While home return switch signal is ON, home return finish signal is 1; while home return switch signal is OFF, home return switch finish signal is 0.)	R	P Mode
R10009	Home Return Dog Signal Source ◦ 0 : OFF , 1 : ON	W	P Mode

	(bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)		
R10010	Home Position Finish ◦ 0 : Not Finish , 1 : Finish (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	R	P Mode
R11732~ R11763	1st~32th Axis Home Return First Section Velocity Ratio (0.01%) For Example : Setting Value is 10000 equals to Override 100% , 1 is 0.01%.	W	P Mode
R10020	Home Return Status ◦ 0 : Waiting , 1 : Executing (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (If home return ON/OFF signal is ON, home return status will keep under executing until home return ON/OFF signal is OFF. Home return status will become waiting status.	R	P Mode
R11764~ R11795	1st~32th Axis Home Return Offset Value Plus Adding Distance(LU) All Home Return Offset Value=Home Return Offset Value + Offset Adding Distance Please refer (R77064~ R77095) for each axis home return off set volume.	W	P Mode
R11796	Home Return Clear Related Coordinate Signal 0 : Clear , 1 : Reserve (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P Mode

## ■ Alarm & Warning

R Value	Description	R/W	Suitable Mode
R10011	Alarm ◦ 0 : None , 1 : Yes (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	R	P / V Mode
R10012	Warning ◦ 0 : None , 1 : Yes (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	R	P / V Mode

## ■ Hardware Limit

R Value	Description	R/W	Suitable Mode
R10013	Trigger Positive Hardware Limit ◦ 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P / V Mode
R10014	Trigger Negative Hardware Limit ◦ 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P / V Mode

## ■ JOG Function

When axis has alarms, this function will not be working.

R Value	Description	R/W	Suitable Mode
R11096	JOG ON/OFF Signal ◦ 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P Mode
R11097	JOG ON/OFF finish signal (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (When JOG ON/OFF signal is ON, JOG ON/OFF finish signal is 1; When JOG ON/OFF signal is OFF, JOG ON/OFF finish signal is 0.)	R	P Mode
R11098	JOG Direction ◦ 0 : + , 1 : - (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P Mode
R11000~ R11031	1 <sup>st</sup> ~32 <sup>st</sup> Axis JOG+ Velocity(KLU/min) (K : Axis Position Mode Velocity Multiplication Rate Constant by parameters R071500~R071531 setting.)	W	P Mode
R11032~ R11063	1 <sup>st</sup> ~32 <sup>th</sup> JOG –Velocity (KLU/min) (K : Axis Position Mode Velocity Multination Rate Constant by parameters R071500~R071531 setting.)	W	P Mode
R11064~ R11095	1 <sup>st</sup> ~32 <sup>th</sup> JOG Velocity Percentage (0.01%) For Example : Setting Value 10000 equals to Override 100%, 1is 0.01%.	W	P Mode

## ■ Positioning Function

When axis has alarms, this function will not be working.

R Value	Description	R/W	Suitable Mode
R11196	Positioning ON/OFF Signal ◦ 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P Mode
R11197	Positioning Finish Signal ◦ 0 : Not Finish , 1 : Finish (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (While triggering positioning switch signal to be ON, it will be get into positional procedure, After positioning procedure finish, the position finish signal will be ON until triggering positioning switch signal OFF, positioning signal shall be OFF.)	R	P Mode
R11198	Positioning Direction ◦ 0 : No Reverse , 1 : Reverse (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (While triggering positioning switch signal ON, the system	W	P Mode

	will updated again.		
R11199	Positioning Distance Type ◦ 0 : Incremental , 1 : Absolute (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (When triggering positioning switch signal ON updating one time.)	W	P Mode
R11100~ R11131	1 <sup>st</sup> ~32th Axis Positioning Distance (LU) (When triggering positioning switch signal ON updating one time.)	W	P Mode
R11132~ R11163	1 <sup>st</sup> ~32th Axis Positioning Velocity (KLU/min) (K : Axis Positioning Mode Velocity Multiple Rate Constant, from R071500~R071531 setting) (When triggering positioning switch signal ON updating anytime.)	W	P Mode
R11164~ R11195	1 <sup>st</sup> ~32th Axis Positioning Velocity Percentage (0.01%) For Example, setting value 10000 equals to Override 100%, and 1 equals to 0.01%. (When triggering positioning switch signal ON updating anytime.)	W	P Mode
R11800~ R11831	1 <sup>st</sup> ~32th Axis Positioning Checking Distance Before Comparison Volume (LU) (When triggering positioning switch signal ON updating one time.)	W	P Mode
R11832~ R11863	1 <sup>st</sup> ~32th Axis Positioning Checking Distance After Comparison Volume (LU) (When triggering positioning switch signal ON updating one time. While cannot position, there will be alarm after 5 seconds. 1 <sup>st</sup> ~32th Axis positioning checking function overtime.	W	P Mode
R11896	1 <sup>st</sup> ~32th Axis Positioning Finish Signal Before Comparison Volumn. 0 : Not Finish , 1 : Finish (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	R	P Mode
R11897	1 <sup>st</sup> ~32th Axis Positioning Finish Signal Before Comparison Volumn. 0 : Not Finish , 1 : Finish (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	R	P Mode

Positioning Function Sequence Illustration as Below:



R11263	(If velocity CMR's numerator and denominator are all setting zero, it means the setting value of CMR's numerator and denominator is based on the setting value of motion parameters.)		
R11264~ R11295	1 <sup>st</sup> ~ 32th Axis Velocity CMR Denominator (If velocity CMR's numerator and denominator are all setting zero, it means the setting value of CMR's numerator and denominator is based on the setting value of motion parameters.)	W	V Mode
R11300~ R11331	1 <sup>st</sup> ~ 32th Axis Velocity DMR Numerator (If velocity DMR's numerator and denominator are all setting zero, it means the setting value of DMR's numerator and denominator is based on the setting value of motion parameters.)	W	V Mode
R11332~ R11363	1 <sup>st</sup> ~ 32th Axis Velocity DMR Denominator (If velocity DMR's numerator and denominator are all setting zero, it means the setting value of DMR's numerator and denominator is based on the setting value of motion parameters.)	W	V Mode
R11364~ R11395	1 <sup>st</sup> ~ 32th Axis Velocity Percentage (0.01%) For Example, Setting Value 10000 is Override 100%, 1 means 0.01%.	W	V Mode
R11298	1 <sup>st</sup> ~ 32th Axis Velocity Mode Command and Feedback Error is Within Tolerance Range Or Not (OFF : Over Range , ON : Within Range) (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (Related parameters R072332~072363 1st ~32 <sup>nd</sup> axis velocity mode command and feedback tolerance range. (MLU/min))	R	V Mode
R11864~ R11895	1 <sup>st</sup> ~ 32th Axis Velocity Mode Speed Information (MLU/min)	R	V Mode
R11900~ R11931	1 <sup>st</sup> ~ 32th Axis Velocity Mode S Code Value	R	P/V Mode

## ■ MPG Position Function

When axis has alarms, this function will not be working.

R Value	Description	R/W	Suitable Mode
R11496	MPG Position ON/OFF Signal ◦ 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P Mode
R11497	MPG Position ON/OFF Finish Signal ◦ (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (MPG position switch signal is ON, MPG position switch finish signal is 1; MPG position switch signal is OFF, MPG position switch finish signal is zero.)	R	P Mode
R11400~ R11431	1 <sup>st</sup> ~ 32th Axis MPG Position Function Multiple Rate (0.01%) For Example, Setting Value 10000 is 1, 1menas 0.0001	W	P Mode
R11432~ R11463	1 <sup>st</sup> ~ 32th Axis MPG Velocity Function Percentage (0.01%) For Example, Setting Value 10000 is Override 100%, 1menas 0.01%.	W	P Mode

## ■ Software Limit Function

Software limit function divides into software coordinates setting and hardware input signal these two kinds. Any one of these conditions exists; the system will trigger software limit warning. If the path is set under auto mode, there will be an alarm. When the same axis positive and negative software limits are setting both zero, it means this axis cancels software coordinate setting kind's software limit function; however, it won't affect hardware input signal type functions.

R Value	Description	R/W	Suitable Mode
R11596	Software Limit Positive Input Signal Source ◦ 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (It can be effective without returning home.)	W	P Mode
R11597	Software Limit Negative Input Signal Source ◦ 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (It can be effective without returning home.)	W	P Mode
R11500~ R11531	1 <sup>st</sup> ~32 <sup>nd</sup> Axis Software Limit Positive Limit Value (LU) (This function shall be effective after returning home.)	W	P Mode
R11532~ R11563	1 <sup>st</sup> ~32 <sup>nd</sup> Axis Software Limit Negative Limit Value (LU) (This function shall be effective after returning home.)	W	P Mode
R10015	Check if it is over software limit positive limit value.	R	P Mode

	(0:N/A ,1:Yes) (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)		
R10016	Check if it is over software limit negative limit value. (0:N/A ,1:Yes) (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	R	P Mode

## ■ Disconnecting Checking Function

R Value	Description	R/W	Suitable Mode
R10017	If there is Vcmd Encoder Disconnecting (0:N/A ,1: Yes) (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	R	P Mode

## ■ Axis Command and Feedback Exceed Max. Tolerance Value Function

R Value	Description	R/W	Suitable Mode
R10018	If there is axis command and feedback exceed max. error value (0: N/A ,1:YES) (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	R	P Mode

## ■ Axis if Return Home Position Finish and Machine Coordinate is Zero Function

R Value	Description	R/W	Suitable Mode
R10019	Axis if return home position finish and machine coordinate is zero function. (0: None, 1: YES) (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	R	P Mode

## ■ Axis Machine Coordinate Information

R Value	Description	R/W	Suitable Mode
R 11564~ R11595	1 <sup>st</sup> ~32 <sup>nd</sup> Axis Machine Coordinate Position (LU) (Provide PLC to obtain and synchronization of machine coordinate position.)	R	P Mode

## ■ Axis Command and Feedback Error Offset Information

R Value	Description	W	Suitable Mode
R11964~ R11995	1 <sup>st</sup> ~32 <sup>nd</sup> Axis command and feedback error offset(LU) Provide PLC to obtain and synchronization of machine coordinate position.)	R	P Mode

## ■ Axis Synchronized Follow Control Function

Axis synchronized follow control function could be appointing certain slave axis to follow the other master axis motion command. And master's motion command could through setting proportional value or CW/CCW slave axis and you could make command to appointed slave axis to make motion command, which has the command to making command to pile up effect. For example, when appointing 2<sup>nd</sup> axis followed the first axis JOG command, while executing, make positioning 100 (LU) command to 2<sup>nd</sup> axis and stop after releasing 1<sup>st</sup> axis jog command. At this moment, the coordinate of 2<sup>nd</sup> axis will be 100(LU) more than 1<sup>st</sup>axis. This is what we called piling up effect. If executing 1<sup>st</sup> axis positioning command 100(LU), and the 2<sup>nd</sup> axis will synchronized follow control function. CMR numerator sets 1 and CMR

denominator sets 2, and the 2<sup>nd</sup> axis will move  $100(LU) \times \frac{1(CMRnumerator)}{2(CMRdenominator)} = 50(LU)$  . While axis

has alarm, this function will not be working.

R Value	Description	R/W	Suitable Mode
R11696	Synchronized Follow Control ON/OFF Signal. 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P / V Mode
R11697	Synchronized Follow Control ON/OFF Finish Signal. (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (If positioning switch signal is ON, positioning switch finish signal is 1; while positioning switch signal is OFF; positioning switch finish signal is 0.)	R	P / V Mode
R11698	Axis Synchronized Follow Control Direction. 0 : Not Reversing Direction , 1 : Reverse Direction (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P / V Mode
R11600~ R11631	Axis No. of Synchronized Control Follow Function. 0 : Not Use , 1~32 : 1st ~32 <sup>nd</sup> Axis	W	P / V Mode
R11664~ R11695	Synchronized Follow Control Function CMR Numerator. (Setting value must be larger than 0 or the set value would not be accepted.)	W	P / V Mode
R11700~ R11731	Synchronized Follow Control Function CMR Denominator (Setting value must be larger than 0, or the set value would	W	P / V Mode

	not be accepted.)		
--	-------------------	--	--

## ■ Axis Pitch Error Offset Update Function

While the axis is preceding laser measuring pitch error make up function, the function is not working. The updating timing is only when the axis machine's coordinate is zero, this function shall be working.

R Value	Description	R/W	Suitable Mode
R10030	Pitch Error Offset Volume Updating ON/OFF Signal. 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P Mode
R10031	Pitch Error Offset Volume Updating On/Off Finish Signal. (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (While pitch error offset value updating switch signal is ON, pitch error offset value updating switch finish signal is 1; while pitch error offset value updating switch signal is OFF, pitch error offset value updating switch finish signal is 0.)	R	P Mode

## ■ Axis Encoder Value Information

R Value	Description	R/W	Suitable Mode
R11632~ R11663	Axis Encoder Value Information (Pulse) (Provide PLC to get synchronized encoder value. If this axis doesn't use encoder, this R value will be zero.)	R	P / V Mode
R11932~ R11963	Axis Servo Encoder Total Feedback Value(LU) (This information is considered to be the same unit and behavior with machine's coordinate and it is the transferring value of actual encoder feedback value. If this axis does not use encoder, the R value will keep as zero.)	R	P / V Mode

## ■ Axis Machine Lock Function

While the axis triggers the machine lock function to be ON (R10023),the axis will not make command to the hardware; meaning not resulting in pulsing to push motor but still update the coordinate. If you OFF the machine lock function, the axis will make command to the hardware, please pay attention at this time that the home coordinate would not be working because of triggering machine lock ON function; It is dangerous that you directly press cycle start to do the machining. To avoid this situation, provide a signal that is ever enable machine lock (R10024) that machine lock function will be ON while at this situation.

R Value	Description	R/W	Suitable Mode
R10023	Axis Machine Lock Function. 0 : Not Locking, 1 : Lock (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P Mode
R10024	If the 1 <sup>st</sup> ~ 32 <sup>nd</sup> axis ever enable machine lock. 0 : None, 1 : Yes (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (While machine lock function is ON, these signals are all OFF; if machine lock function is OFF and the axis ever triggered machine lock ON, this signal will be ON. If you want to make this signal OFF, pls execute axis home returning.)	R	P Mode

## ■ Axis Ignore Input Command Function

When the axis triggers ignoring input command function ON (R10026), the axis will not accept input command of path and axis. When the axis triggers ignore positive input command function ON(R10028), the axis would not accept positive command input of path and axis.(R11898), the axis will not accept negative command input of path and axis. Please pay attention, if you executing this program under AUTO mode and the system status is running, trigger ignore input command from OFF to ON may lead to different coordinates. Please be careful while you apply this function. We recommend this function switch should be proceeding under “Machine Ready” status.

R Value	Description	R/W	Suitable Mode
R10026	Axis Enable Ignore Input Command Function. 0 : Not Ignore 1 : Ignore (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P Mode
R10027	Axis Enable Ignore Input Command Function Status. 0 : Not Ignore 1 : Ignore (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (When ignore input command function is ON, these signals are all OFF; if ignore input command function is OFF, these signals are all OFF.)	R	P Mode
R10028	Axis Enable Ignore Positive Input Command Function. 0 : Not Ignore 1 : Ignore (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P Mode
R10029	Axis Enable Ignore Positive Input Command Function Status. 0 : Not Ignore 1 : Ignore (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (While ignoring input command function is ON, the signal	R	P Mode

	is all OFF; if ignore input command function is OFF, the signal is all OFF.)		
R11898	Axis Enable Ignore Negative Input Command Function. ◦ 0 : Not Ignore , 1 : Ignore (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P Mode
R11899	Axis Enable Ignore Negative Input Command Function Status. ◦ 0 : Not Ignore , 1 : Ignore (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (While ignoring input command function is ON, the signal is all OFF; if ignore input command function is OFF, the signal is all OFF.)	R	P Mode

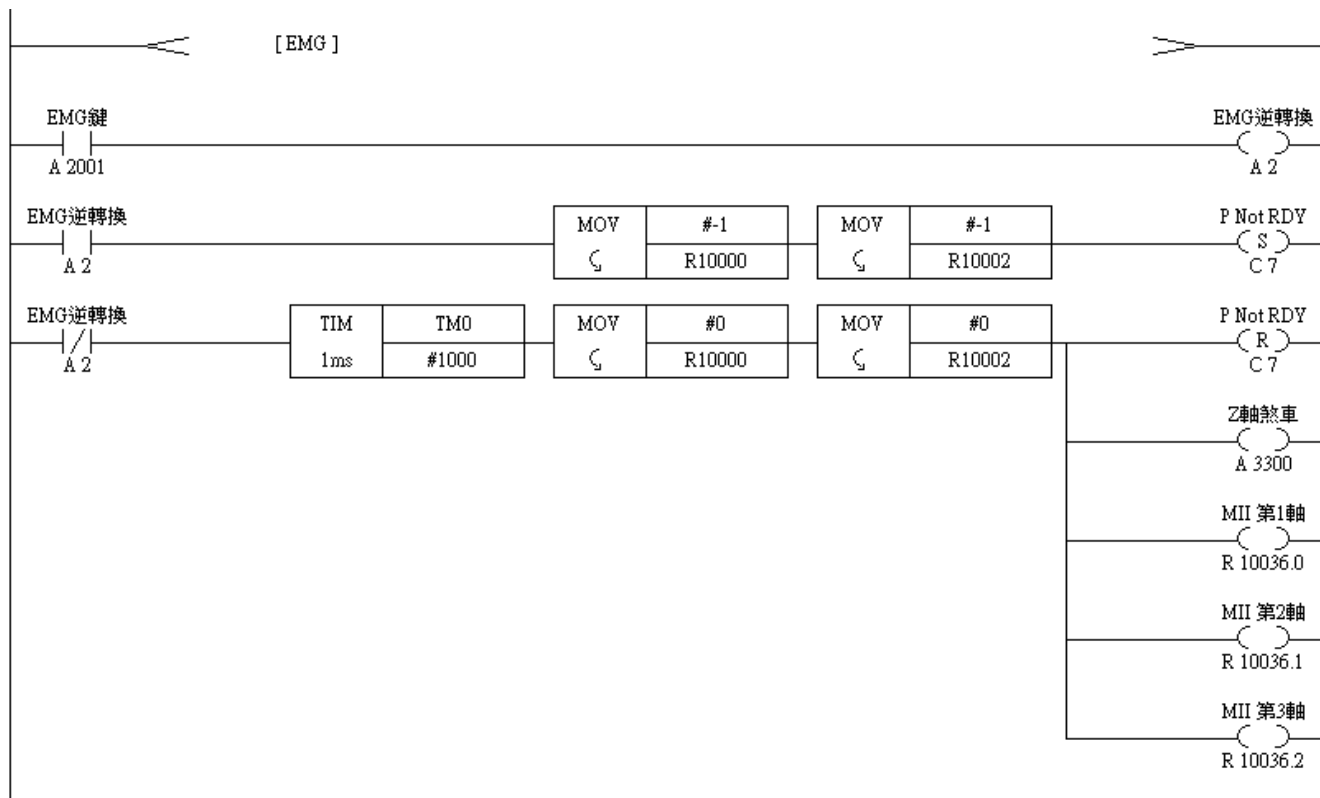
## ■ Electric CAM Function

R Value	Description	R/W	Suitable Mode
R10032	Electric CAM Executing ON/OFF Signal. ◦ 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P Mode
R10033	Electric CAM Executing ON/OFF Finish Signal. (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (While electric cam executing ON/OFF signal is ON, electric cam executing ON/OFF finish signal is 1; while electric cam executing switch signal is OFF, electric cam executing switch finish signal is 0.)	R	P Mode
R10034	Electric CAM Coordinate Data Updating ON/OFF Switch. ◦ 0 : OFF , 1 : ON (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) When axis is having alarm, this function would not be working. The updating timing would be at the zero machine coordinate of this axis, this function is working.	W	P Mode
R10035	Electric CAM Coordinate Data Updating ON/OFF Finish Signal. (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis) (While electric cam coordinate data updating switch signal is ON, electric cam coordinate data switch finish signal is 1; when electric cam coordinate data updating switch signal is OFF, electric cam coordinate data updating switch finish signal is 0.)	R	P Mode

## ■ Axis Servo ON/OFF Function

This function must be applied under all digit controller type; other type of LNC controllers does not support this function. PLC example as below:

R Value	Description	R/W	Suitable Mode
R10036	1 <sup>st</sup> ~32 <sup>nd</sup> Axis Servo ON/OFF Command ◦ 0 : : Servo OFF , 1 : Servo ON ◦ (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	W	P/V Mode
R10037	1 <sup>st</sup> ~32 <sup>nd</sup> Axis Servo ON/OFF Finish Signal (0 : Not Finish , 1 : Finish) ◦ (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	R	P/V Mode
R10038	1 <sup>st</sup> ~32 <sup>nd</sup> Axis Servo ON/OFF Status. 0 : : Servo OFF , 1 : Servo ON ◦ (bit0: 1 <sup>st</sup> Axis, bit1: 2 <sup>nd</sup> Axis..., bit31 : 32 <sup>nd</sup> Axis)	R	P/V Mode



## 1.2. PLC/HMI & NC Interface (Public Interface, Nothing to do with Projects-R29,000~R29,999)

- Alarm is dealt by “bit”.
- When triggering PLC Alarm, system will stop until you press RESET.  
When triggering PLC Warning, system won't stop, it will only display message.

Range	Size	Description	String Number
R29,000~	50	PLC Alarm (PLC No.0~No.1600 Alarm)	
R29,050~	50	PLC Warning (PLC No. 0~No.1600 Warning)	
R29,100~	50	AI Read Value	
R29,150~	50	AO Read Value	
R29,200~	64	Read Temp. Value (0.001degree,Ch0~Ch63)	
R29,264	1	Temperature Sensor Disconnect (Bit 0~31:Ch0~Ch31)	
R29,265	1	Temperature Sensor Disconnect (Bit 32~63:Ch32~Ch63)	
R29,266	1	Temp.Value Reading Ready Finish (Bit 0~31:Ch0~Ch31)	
R29,267	1	Temp.Value Reading Ready Finish (Bit 32~63:Ch32~Ch63)	
R29,268~R29,271	4	Temp. Module 1~4: Transferring Finish Channel (-1:Transferring ,0~15: Transferring Finish Channel ,one pulse)	
R29,272~R29,275	4	Temp. Module 1~4:Current Scan Channel (0~15)	
~R29,999	...	Reserve	