SYNTEC TECHNOLOGY CO.,LTD.

Macro Variable.

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Variable applied in MACRO can be separated into 3 categories, which are Local Variables (#1~#400), System Variables (#1000~#31986) and Global Variables (@1~@165535). Rules of life cycle, reading, and writing are different in each category, further details is given in chapters below.

1 Global Variables

Number	Description	R/W Rule	Data Type
@0	VACANT	R	-
@1~ @400	General operation variables	R/W	Double
@401~ @655	Corresponding to registers R1~R255	R/W	Long
@656~ @999	Memorable variables (remained after power off)	R/W	Double
@1000	System variables. User is forbidden to use this (version: 10.114.x/10.116.x)	R	Double
@1001~ @1999	Memorable variables (remained after power off)	R/W	Double
@10000~ @14095	Corresponding to registers R0~R4095	R/W	Long
@60000~ @79999	Expansion global variables (go with No3813, only for CE system)	R/W	Double
@100000~ @165535	Corresponding to registers R0~R65535	R/W	Long
Remarks	• Unless being power-off, all global variables have no life cycle limit. • If @1~@400 needs to be remained after power-off, please goes with No3811. • DOS only supports R0~R7999, please be extra careful when applying the corresponding global variables. • For register corresponding to @, the available range is as below: • R50~R80, R101~R511, R1024~R4095, R5800~R7999, R10000~R10999, R15000~R65535		

2 Local Variables

Number	Descriptions	R/W Rule	Data Type
#0	VACANT	R	-
#1~ #26	System-reserved local variables for MACRO arguments	R/W	Double
#27~ #400	Local variables for MACRO program and subprogram	R/W	Double
Remarks	• The life cycle of local variables applied in MACRO is limited to the MACRO execution. After execution is done, local variable returns to VACANT automatically. • Subprogram can share local variables with main program, the life cycle of local variable also ends when main program is completed. • Please refer to "Argument Explanation for MACRO argument chart.		

3 System Variables

3.1 Modal Information in pre-interpreting(#1000~#1112)

Number	Descriptions	R/W Rule	Data Type
#1000	Interpolation Mode Common：00, 01, 02, 03, 33, 34, 83, 84, 85, 87, 88, 89 For lathe only：20, 21, 21002, 24, 83001, 83002, 83003, 84001, 84002, 87001, 87002, 87003, 88001, 88002 For non-lathe system：73, 74, 76, 81, 82, 86	R/W	Long
#1002	Plane Selection: 17, 18, 19	R	Long
#1004	Absolute/Increment Command: 90, 91	R	Long
#1006	Stroke Limit: 22, 23	R	Long
#1008	Machining Feeding: 94, 95	R	Long
#1010	Imperial/SI Units: 70, 71	R	Long
#1012	Cutter Radius Compensation: 40, 41, 42	R	Long
#1014	Tool Length Compensation: 43, 44, 49	R	Long
#1016	Scaling Mode, Mirror Image Mode: G50, G50.1: #1016=50; G51, G51.1: #1016=51	R	Long
#1018	Spindle Speed: 96, 97	R	Long
#1020	Cutting Feeding Control Mode: 61, 62, 63, 64	R	Long
#1022	Rotation/Turret Mirror Mode: 68, 69	R	Long
#1024	Spindle Rotation Speed Change Detection Mode: 25, 26	R	Long

#1026	Polar Coordinates Interpolation Mode: 12.1, 13.1	R	Long
#1028	Polar Coordinates Command Mode: 15, 16	R	Long
#1030	Cutter Radius Compensation Tool Number: D code	R	Long
#1032	Tool Length Compensation Tool Number: H code	R	Long
#1034	Spindle Rotation Speed: S code	R	Long
#1035	Machining Spindle Rotation Speed	R	Long
#1036	Tool Number: T code	R	Long
#1038	Auxiliary Function: M code	R	Long
#1040	Current Workpiece Coordinate System Number: G54: #1040=1; G55: #1040=2; G56: #1040=3…	R	Long
#1042	Serial Sequence Number: N code	R	Long
#1044	Previous Block Interpolation Mode of G66, G66.1, which might be 0, 1, 2, 3, 4, 31, 33, 34, 2004, 3004, 28001 or vacant(if the previous block is M/S/T/F code)	R	Long
#1046	Feeding Amount: F code. G94：IU/min, G95：IU/rev.	R	Double
#1048	Current Line Number	R	Long
#1050	Program Starting Serial Sequence Number	R	Long
#1052	Program Starting Line Number	R	Long
#1054	Spindle Operation Mode (M03, M04, M05)	R	Long
#1056	Current Interpreting Program Number: N Code	R	Long
#1060	System Kernel Variable	-	-

#1061	System Kernel Variable	-	-
#1062	System Kernel Variable	-	-
#1063	1：Interpret to the last T code in the line; 0：others	R	Long
#1064	SI/Imperial Unit Mode	R	Long
#1065	System Kernel Variable	-	-
#1066	System Kernel Variable	-	-
#1071	Single-Axis Speed Percentage of Robot FJ Internal Axis	R	Double
#1072	Feeding Speed in Linear Direction of Robot FL Assigned End Point	R	Double
#1073	Feeding Speed in Rotary Direction of Robot FR Assigned End Point	R	Double
#1074	Single-Axis Speed Percentage of Robot FEJ External Axis	R	Double
#1075	Type of the Smoothing Command of Robot. 0: No Smoothing Command, 1: PL, 2: PQ, 3: PR	R	Long
#1076	Parameter of the Smoothing Command of Robot. PL: Level of Smoothing[0 ~ 10]; PQ: mm; PR: deg	R	Double
#1100	Main Program Ending M Code: #0, 02, 30, 99 (only enable when the "auxiliary program before & after machining" is activated)	R	Long
#1101~ #1110	Recording the 10 closest M codes when executing mid-program return (only enable when Pr3851 is set to 999900) (version: 10.116.24T, 10.116.36)	R	Long
#1111	Initial assigned mid-program return line number in Intelligent mid-program return line number mode(Pr3851 = 999901)	R	Long
#1112	Positioning command line number in Intelligent mid-program return line number mode(Pr3851 = 999901)	R	Long

3.2 Operation Control/State Variables (#1500~#1625)

Number	Descriptions	R/W Rule	Data Type
#1500	Quiet mode, system only records the program coordinate and does not organize the motion plan 0：OFF; 1：ON	R/W	Long
#1501	G00 motion type, invalid after Reset 0：according to value of Pr411; 1：linear	R/W	Long
#1502	• Bit 0：Whether to run single-block execution control when PLC C40 is on 0：run single-block execution (default), return to 0 after system Reset 1：don't run single block execution • ~~Bit1：Whether the system continue to run the following program before MST codes are not finished (not provided for now)~~ ~~0：wait (default), return to 0 after system Reset~~ ~~1：don't wait, thus PLC S30(DEN) won't output~~ • If single block execution function is not enable, step function of simulation is not supported.	R/W	Long
#1504	• Bit 1：Whether feedhold and axis/spindle override take effect 0：Feedhold and axis/spindle ratio Override take effect (default value) 1：Feedhold invalid during machining, axis/spindle override is fixed to 100%. • Bit 2：Whether feedhold takes effect 0：Feedhold takes effect during machining (default value) . 1：Feedhold during machining is invalid. • Bit 3：Whether rapid moving ratio override take effect 0：Rapid moving ratio override takes effect during machining (default value) 1：Rapid moving ratio fixed to 100% during machining. • Bit 4：Whether cutting ratio override take effect 0：Cutting ratio override takes effect during machining (default value) 1：Cutting ratio fixed to 100% during machining. • Bit 5：Whether spindle ratio override take effect 0：Spindle ratio override takes effect during machining (default value) 1：Spindle ratio fixed to 100% during machining. Note 1: #1504.2~#1504.5 is valid after version 10.114.51 Note 2: If #1504 bit1, bit2 on, Reset is invalid. If #1504 bit1, bit3~bit5 on, the MPG simulation will be inactive when running the corresponding motion.(all / rapid move / cutting / spindle).	R/W	Long

Number	Descriptions	R/W Rule	Data Type
#1505	• Bit 1：Reserved • Bit 2：Reserved • Bit 3：Reserved • Bit 4：Reserved • Bit 5：Lock spindle feeding ratio override 0：Spindle feeding ratio override takes effect during machining (default value). 1：Spindle feeding ratio during machining is fixed to the setup value. Note：When #1505 and #1504 is applied at the same time, #1505 overrides #1504. This function is valid in versions 10.114.56E, 10.116.0E, 10.116.5 and after.	R/W	Long
#1506	Simulation Mode. 2 modes in Interpreting NC program 0：General interpreting mode, applied when system is running functions, such as motion plan organizing, interpolation, etc. 1：Graphic simulation mode, applied when system is obtaining the size of program.	R	Long
#1507	Simulation on/off (only affects simulation) 0：Resume/activate graphic simulation 1：Turn off graphic simulation (Function for versions 10.116.x)	W	Long
#1508	Number of the path currently executing the Macro 1：1st Path；2：2nd Path；3：3rd Path；4：4th Path	R	Long
#1509	Tool auto retract function is forbidden in axis. • Bit 0：Reserved • Bit 1：Set to 1, 1st axis is forbidden; set to 0, 1st axis is not banned. • Bit 2：Set to 1, 2nd axis is forbidden; set to 0, 2nd axis is not banned. • ... • Bit 18：Set to 1, 18th axis is forbidden; set to 0, 18th axis is not banned. • Bit 19~31：Reserved Note：For now, only supports Syntec M3 drive.	R/W	Long

<table>
<tr><th>Number</th><th>Descriptions</th><th>R/W Rule</th><th>Data Type</th></tr>
<tr><td>#1510</td><td>FileOperationControlWord
<table>
<tr><td rowspan="2">Bit 0</td><td>0</td><td>Turn off Main Program Reloading</td></tr>
<tr><td>1</td><td>Activate Main Program Reloading</td></tr>
<tr><td rowspan="2">Bit 1</td><td>0</td><td>Turn off Subprogram Reloading</td></tr>
<tr><td>1</td><td>Activate Subprogram Reloading</td></tr>
<tr><td rowspan="2">Bit 2</td><td>0</td><td>Update main program and subprogram information (filename, line number, serial sequence number)</td></tr>
<tr><td>1</td><td>Only update the main program information (filename, line number, serial sequence number)</td></tr>
<tr><td>Others</td><td colspan="2">Reserved</td></tr>
</table>
Notifications：If this parameter is modified during machining, it takes effect when interpreted-instructions before #1510 are all completed.</td><td>R/W</td><td>Long</td></tr>
<tr><td>#1512</td><td>G04.1 Synchronous Waiting flag
0：General non-Synchronous Waiting state; 1：Synchronous Waiting state
Note：The function is no longer provided after version 10.116.</td><td>R</td><td>Long</td></tr>
<tr><td>#1514</td><td>G33 Thread Turning flag
0：General Turning state; 1：Tool Feeding/Retracting Turning state; 2：Tool Broaching state</td><td>R/W</td><td>Long</td></tr>
<tr><td>#1515</td><td>General Tapping Tool Retracting Block flag</td><td>R/W</td><td>Long</td></tr>
<tr><td>#1517</td><td>System Variable</td><td>R/W</td><td>Long</td></tr>
<tr><td>#1600</td><td>Least Input Unit for Linear Axis, corresponds to Pr17 control precision(Least Input Unit, LIU)</td><td>R</td><td>Long</td></tr>
<tr><td>#1602</td><td>Least Input Unit for Rotary Axis, corresponds to Pr17 control precision(Least Input Unit, LIU)</td><td>R</td><td>Long</td></tr>
</table>

Number	Descriptions	R/W Rule	Data Type
#16004	Is U, V, W seen as increment command mode of X, Y, Z axis 0：seen as normal command mode of U, V, W axis 1：seen as increment command mode of X, Y, Z axis	R	Long
#16006	Element amount in STACK in Macro	R	Long

<table>
<tr><th>Number</th><th>Descriptions</th><th>R/W Rule</th><th>Data Type</th></tr>
<tr><td>#1608</td><td>

bit 0：Is the skip source corresponding to G31 Skip Function triggered
0：Not triggered
1：Already Triggered (after C62 ON, the axis starts decelerating to 0, and the 0th bit of #1608 is 1 only when the axis completely decelerates to 0)
bit 1~18：Is the skip source corresponding to each axis set by G31.10 triggered while executing multi-axis multi-signal skip function? Bit 1~18 are corresponding to the 1st~18th axis.
0：Not triggered
1：Already Triggered (after C62 ON, the axis starts decelerating to 0, and the bit value of the corresponding axis is 1 only when the axis completely decelerates to 0)

<table>
<tr><th>Command</th><th>Skip function(G31)</th><th>Multi-axis multi-signal skip function(G31.10/G31.11)</th></tr>
<tr><td>#1608</td><td>bit 0</td><td>bit 1~18</td></tr>
<tr><td>notes</td><td colspan="2">No matter which function is used, the value of unsupported bit is equal to 0.</td></tr>
</table>
Example：
There are axes: X, Y, Z1, Z2, Z3, Z4， the corresponding Pr21~ and Pr321~ are listed below。

Use skip function(G31) and set Z1, Z2, Z3 corresponding to the skip source.
After skip source is triggered , each bit value of #1608 is：
bit 0：1
bit 1~18：0
Therefore, the value of #1608 is 2^0=1.
Use multi-axis multi-signal skip function(G31.10/G31.11) and set Z1, Z2, Z3 to be axes corresponding to the different skip source.
After signals corresponding to Z1 and Z3 are triggered and Z1 and Z3 are stopped, each bit value of #16-8 is：
bit 0：0
bit 1~18：

<table>
<tr><th>Command</th><th colspan="6">G31.10 & G31.11</th></tr>
<tr><td>Axis corresponding axis card port number(Pr21~)</td><td>Pr21</td><td>Pr22</td><td>Pr23</td><td>Pr24</td><td>Pr25</td><td>Pr26</td></tr>
<tr><td>Axis name(Pr321~)</td><td>X</td><td>Y</td><td>Z_1</td><td>Z_2</td><td>Z_3</td><td>Z_4</td></tr>
<tr><td>bit</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
<tr><td>value</td><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td></tr>
</table>
</td><td>R</td><td>Long</td></tr>
</table>

Number	Descriptions	R/W Rule	Data Type
	Therefore, the value of #1608 is 23+25=40. **Notes：#1608 is cleared to 0 if CNC just powered on, RESET, system executing G31, G31.11 or G28.1 again.**		
#1610	Stop angle if spindle orientation	R	Long
#1612	Default workpiece coordinates number: G54: #1040=1; G55: #1040=2; G56: #1040=3…	R/W	Long
#1616	Serial sequence number of mid-program restart	R	Long
#1618	Line Number Number of mid-program Restart	R	Long
#1620	Real-time serial sequence number in program (The default value is set to be 0.)	R	Long
#1622	Real-time line number in program (The default value is set to be 1 except for the Graphical Simulation, whose default value is set to be 0.)	R	Long
#1624	Real-time valid spindle number (The default value is set to be 0.)	R	Long
#1625	Default preferred tool alignment solution type 0 : the 1st rotary axis (Master axis) moves along with the shortest contour;(default value) 1 : the 1st rotary axis rotates towards positive direction; 2 : the 1st rotary axis rotates towards negative direction;	R/W	Long

3.3 Coordinate System Information, #1301~#1478

Number	Descriptions	R/W Rule	Data Type
#1301~ #1318	Program coordinate of each axis at the end of the block (please note, if system reads #1301~#1308 immediately in the next line of G43, G44, G49, G53, G54, G54 P_, G92.1, the program coordinate of last moving command block is obtained. It's suggested to apply #1341~#1358 or #1411~#1419 to get the current program coordinate of each axis)	R	Double
#1321~ #1338	Machine coordinate of each axis, which is not readable while moving.	R	Double
#1341~ #1358	Current program coordinate of each axis.	R	Double
#1361~ #1378	The program coordinate of each axis when the skip source corresponding to G31 or G31.10/G31.11 skip function is triggered. For software versions 10.116.38M, 10.116.54K, 10.118.0F, 10.118.6 and after, the value is cleared to 0 if CNC just powered on, RESET, program ends, system executing G31, G31.11 or G28.1 again, to avoid showing the previous escape location before skip signal comes in and causes misjudgment.	R	Double
#1381~ #1398	Tool length compensation value of each axis	R	Double
#1401~ #1403	Center vector (I, J, K) of last arc command	R	Double

Number	Descriptions	R/W Rule	Data Type
#1404~ #1406	Tool vector coordinate	R	Double
#1411~ #1419	Workpiece coordinate of XYZABCUVW axes at the end of the block, the correspondence are: 1411(X); 1412(Y); 1413(Z) 1414(A); 1415(B); 1416(C) 1417(U); 1418(V); 1419(W)	R	Double
#1441~ #1458	The machine coordinate of each axis when the skip source corresponding to G31 or G31.10/G31.11 skip function is triggered. For software versions 10.116.38M, 10.116.54K, 10.118.0F, 10.118.6 and after, the value is cleared to 0 after CNC just powered on, RESET, program ends, system executing G31, G31.11 or G28.1 again, to avoid showing the previous escape location before skip signal comes in and causes misjudgment.	R	Double
#1461~ #1478	Offset value of each axis when executing Enable Halted Point Return (Pr3852)	R	Double
#1481~ #1483	Position of rotary axes that can achieve tool alignment with tilted working plane. Units are IU. Relation to rotary axis is: 1481(A axis); 1482(B axis); 1483(C axis) Notice: • If the tool alignment angle for corresponding axis direction is invalid, the # value will return VACANT.	R	Double

3.4 Runtime State, #1800~#1978

Number	Descriptions	R/W Rule	Data Type
#1800	Tracking error of rigid tapping on rotary axis (milli degree)	R	Double

#1801	Tracking error of rigid tapping on Z axis (μm)	R	Double
#1802	Maximum tracking error of rigid tapping on Z axis (μm)	R	Double
#1803	Maximum tracking error of 2nd rigid tapping on Z axis (μm) Valid version: 10.114.16~10.116.5	R	Double
#1804	Maximum tracking error of 3rd rigid tapping on Z axis (μm) Valid version: 10.114.16~10.116.5	R	Double
#1805	Maximum tracking error of 4th rigid tapping on Z axis (μm) Valid version: 10.114.16~10.116.5	R	Double
#1806	Maximum tracking error of 5th rigid tapping on Z axis (μm) Valid version: 10.114.16~10.116.5	R	Double
#1807	Maximum tracking error of 6th rigid tapping on Z axis (μm) Valid version: 10.114.16~10.116.5	R	Double
#1810	Feedback pulse number of gap control from Z axis encoder	R	LONG
#1814	Define axis a radius axis or diameter axis • Bit 0：Reserved • Bit 1：0, 1st axis is a radius axis; 1, 1st radius is a diameter axis • Bit 2：0, 2nd axis is a radius axis; 1, 2nd radius is a diameter axis • ... • Bit 18：0, 18th axis is a radius axis; 1, 18th radius is a diameter axis • Bit 19~31：Reserved	R	LONG
#1815	Teaching function 0: disabled; 1: enabled	R	Double
#1816	Feedrate setting of teaching function (IU/min)	R/W	Double
#1817	D code	R	LONG
#1818	H code	R	LONG
#1819	Path output mode. System organizes the motion plan and output the path to Macro Stack (for G73), please execute WAIT() before using 0: disabled; 1: enabled	R/W	LONG
#1820	Mute mode. System organizes the motion plan without actual command output. Goes with G10 L1100. 0: disabled; 1: enabled	R/W	Double

<table>
<tr><td>#1821</td><td>Accumulated cutting length</td><td>R/W</td><td>Double</td></tr>
<tr><td>#1822</td><td>Cutting feedrate command F(mm/min)</td><td>R/W</td><td>Double</td></tr>
<tr><td>#1823</td><td>Spindle rotation speed command (RPM)</td><td>R/W</td><td>Double</td></tr>
<tr><td>#1824</td><td>Valid cutting control mode, G61, G62, G63, G64</td><td>R</td><td>Double</td></tr>
<tr><td>#1825</td><td>Valid interpolation mode
<table>
<tr><th>G code</th><th>Display</th><th>G code</th><th>Display</th><th>G code</th><th>Display</th><th>G code</th><th>Display</th></tr>
<tr><td>G00</td><td>0</td><td>G02.4</td><td>2004</td><td>G28.1</td><td>28001</td><td>MOVL</td><td>1001</td></tr>
<tr><td>G01</td><td>1</td><td>G03.4</td><td>3004</td><td>G900.81 (rapid drilling)</td><td>900081</td><td>MOVJ (axis input)</td><td>1002</td></tr>
<tr><td>G02</td><td>2</td><td>G31</td><td>31</td><td>G01.84 (rapid tapping)</td><td>1084</td><td>MOVJ (end point input)</td><td>1003</td></tr>
<tr><td>G03</td><td>3</td><td>G33</td><td>33</td><td></td><td></td><td>MOVC</td><td>1004</td></tr>
<tr><td>G04</td><td>4</td><td>G34</td><td>34</td><td></td><td></td><td></td><td></td></tr>
</table></td><td>R</td><td>Double</td></tr>
<tr><td>#1826</td><td>HPCC mode (optional function)
0: disabled; non-0: enabled
HMI show HPCC on monitor screen by checking #1826
Valid version: after 10.116.0I，10.116.6B (included)</td><td>R</td><td>Double</td></tr>
<tr><td>#1827</td><td>Valid workpiece coordinate number. G54: #1040=1; G55: #1040=2; G56: #1040=3…</td><td>R</td><td>Double</td></tr>
<tr><td>#1828</td><td>Estimated machining error with current operating parameters (BLU, not displaying when Pr3808 is set to 0)
Valid version: before 10.116.54A (included)</td><td>R</td><td>Double</td></tr>
<tr><td>#1829</td><td>Selection of multiple sets of HSHP parameters</td><td>R/W</td><td>Double</td></tr>
</table>

<table>
<tr><td>#1830</td><td>The servo backward compensation function applied, each number represents:<table><tr><th>#1830</th><th>0</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr><tr><td>compensation function applied</td><td>none</td><td>Pn109</td><td>SPA</td><td>SPA + Pn109</td><td>ZPEC</td><td>ZPEC + Pn109</td></tr></table>Note 1: Pn109 is the feedforward of Yaskawa drive, enabled when it's bigger than 0.
Note 2: ZPEC and SPA won't be enabled at the same time.
Note 3: if #1830 = 3 or 5, it means 2 servo backward compensation functions are enabled at the same time, it might lead to intense vibration of the machine.
Valid version: after 10.116.33 (included)</td><td>R</td><td>Double</td></tr>
<tr><td>#1831</td><td>Machining spindle coupling mode, G51.2 , G113 , G114.1 , G114.3</td><td>R</td><td>Double</td></tr>
<tr><td>#1832</td><td>Absolute/Increment command mode, 90, 91</td><td>R</td><td>Double</td></tr>
<tr><td>#1833</td><td>Modal G code interpolation mode<table><tr><th>G code</th><th>Display</th><th>G code</th><th>Display</th><th>G code</th><th>Display</th></tr><tr><td>G00</td><td>0</td><td>G02.4</td><td>2004</td><td>MOVL</td><td>1001</td></tr><tr><td>G01</td><td>1</td><td>G03.4</td><td>3004</td><td>MOVJ (axis input)</td><td>1002</td></tr><tr><td>G02</td><td>2</td><td>G33</td><td>33</td><td>MOVJ (end point input)</td><td>1003</td></tr><tr><td>G03</td><td>3</td><td>G34</td><td>44</td><td>MOVC</td><td>1004</td></tr></table></td><td>R</td><td>Double</td></tr>
<tr><td>#1834</td><td>Plane selection mode, 17, 18, 19</td><td>R</td><td>Double</td></tr>
<tr><td>#1835</td><td>Absolute/Increment command mode, 90, 91</td><td>R</td><td>Double</td></tr>
<tr><td>#1836</td><td>Stroke limit mode, 22, 23</td><td>R</td><td>Double</td></tr>
<tr><td>#1837</td><td>Machining feeding mode, 94, 95</td><td>R</td><td>Double</td></tr>
<tr><td>#1838</td><td>Imperial, SI Units mode, 70, 71</td><td>R</td><td>Double</td></tr>
<tr><td>#1839</td><td>Cutter radius compensation mode, 40, 41, 42</td><td>R</td><td>Double</td></tr>
</table>

#1840	Tool length compensation mode, 43, 44, 49	R	Double
#1841	Scale mode, 50, 51	R	Double
#1842	Spindle speed mode, 96, 97	R	Double
#1843	Cutting feeding control mode, 61, 62, 63, 64	R	Double
#1844	Rotation/Turret Mirror mode, 68, 69	R	Double
#1845	Spindle rotation speed change detection mode, 25, 26	R	Double
#1846	Polar coordinate interpolation mode, 12.1, 13.1	R	Double
#1847	Polar coordinate command mode, 15, 16	R	Double
#1851	System kernel variable	R	Long
#1852	System kernel variable	R	Long
#1854	System kernel variable	R	Long
#1855	Is the machining spindle a serial spindle 0: Pulse Spindle; 1: Serial Spindle	R	Long
#1856	Tapping Start Position (point R level in absolute). Reserved when restart, Unit : mm	R/W	Double
#1857	Tapping Spindle CW / CCW Mode. Reserved when restart. 0 : 未給定 3 : CW 4 : CCW	R/W	Long
#1858	Tapping Spindle Speed. Reserved when restart, Unit : rev/min	R/W	Long
#1859	Tapping Axis Feedrate. Reserved when restart, Unit : mm/min	R/W	Double
#1881 ~ #1898	MPG offset value of each axis The offset value of each path needs to be set independently, if using MPG offset on HMI screen to modify the setting, only the axes of 1st path can be modified	R/W	Double

#1901 ~ #1918	G92, G92.1 coordinate system offset value of each axis	R/W	Double
#1930	G92.1 coordinate system rotation angle Notice: The default value is 0. Depending on Pr413, the value will be restored to default value after CNC reset or reboot.	R/W	Double
#1931 ~ #1933	axis of G92.1 coordinate system rotation center Notice: The default values are 0, 0, 1. Depending on Pr413, the values will be restored to default value after CNC reset or reboot.	R/W	Double
#1941 ~ #1958	3rd software positive stroke limit of each axis (IU)	R/W	Double
#1961 ~ #1978	3rd software negative stroke limit of each axis (IU)	R/W	Double

Robot Product (ARTIC, DELTA, SCARA) Definition Changes

Number	Descriptions	R/W Rule	Data Type
#1901~ #1906	1st layer offset value of partial offset (IU) X, Y, Z, A, B, C	R	Double
#1911~ #1916	2nd layer offset value of partial offset (IU) X, Y, Z, A, B, C	R	Double
#1921~ #1926	3rd layer offset value of partial offset (IU) X, Y, Z, A, B, C	R	Double

3.5 Modal variables, #1080~#3100

Number	Descriptions	R/W Rule	Data Type
#1080~ #1099	Modal variables for electric control personnel (disappear when system power off)	R/W	Long

Number	Descriptions	R/W Rule	Data Type
#2001~ #2100	Modal variables for system internal use (disappear when system reset)	R/W	Double
#3001~ #3100	Modal variables for electric control personnel (disappear when system reset)	R/W	Double
Remarks	• Life cycle of modal variables is not limited to a single MACRO. Thus, it can be used to access variables between different MACROs. • #1080~1099 only support Long type value, or it will issue the COR-054 Incompatible data type alarm.		

3.6 Customer Param., #4001~#5500

Number	Descriptions	R/W Rule	Data Type
#4001~ #4100	Customized parameters fro system internal use (parameter 4001~4100)	R	Double
#5001~ #5500	Customized parameters for electric control personnel (parameter 5001~5500)	R	Double
Remarks	Please refer to EMC6_C005_擴充參數使用說明文件 to enable #5001~ display		

3.7 Interface Signals, #6001~#6032

Number	Descriptions	R/W Rule	Data Type

#6001~ #6032	MLC interface signal, C101~C132, S101~S132
	Ex:
	@1 := #6001; // assign C101 state to @1. If C101 On then @1=1, @1=0 if opposite
	#6001 := @2; // assign content of @2 to S101. If @2=1 then S101 On, S101 Off if opposite
		R/W	Double

Remarks			

3.8 Tool Compensation, #10000~#15288

Pr3816 set 0 or 1 **Single-Axis Tool Table** **Milling Tool Table**				
Number	**Tool Length Compensation (H)**		**Cutter Radius Compensation(D)**	
	Geometric Compensation	**Worn Out Compensation**	**Geometric Compensation**	**Worn Out Compensation**
0 1 … 96	#11000 #11001 … #11096	#10000 #10001 … #10096	#13000 #13001 … #13096	#12000 #12001 … #12096
97 … 200	#11097 … #11200	#10097 … #10200	#13097 … #13200	#12097 … #12200
201 … 400	#11201 … #11400	#10201 … #10400	#13201 … #13400	#12201 … #12400
Remarks	• All compensations of tool 0 are 0 • So far, the controller provides 96 compensation of tools in standard. By different models, there are up to 200 compensation of tools supported. • Data type of all variables above is Double			

Pr3816 set 2 **Multi-Axis Tool Table** **Lathe Tool Table**						
Number	**Tool Length Compensation (H)**		**Cutter Radius Compensation (D)**			
	Geometric Compensation	**Worn Out Compensation**	**Geometric Compensation**	**Worn Out Conpensation**	**Tool Nose Direction**	**Tool Nose Direction**

1	#11001(1st) #11002(2nd) #11003(3rd) #11401(4th) #11402(5th) #11403(6th)	#31101(1st) #31201(2nd) #31301(3rd) #31401(4th) #31501(5th) #31601(6th) #31701(7th) #31801(8th) #31901(9th) #32001(10th) #32101(11th) #32201(12th)	#10001(1st) #10002(2nd) #10003(3rd) #10401(4th) #10402(5th) #10403(6th)	#35101(1st) #35201(2nd) #35301(3rd) #35401(4th) #35501(5th) #35601(6th) #35701(7th) #35801(8th) #35901(9th) #36001(10th) #36101(11th) #36201(12th)	#13003	#12003	#14003	#15003
2	#11004(1st) #11005(2nd) #11006(3rd) #11404(4th) #11405(5th) #11406(6th)	#31102(1st) #31202(2nd) #31302(3rd) #31402(4th) #31502(5th) #31602(6th) #31702(7th) #31802(8th) #31902(9th) #32002(10th) #32102(11th) #32202(12th)	#10004(1st) #10005(2nd) #10006(3rd) #10404(4th) #10405(5th) #10406(6th)	#35102(1st) #35202(2nd) #35302(3rd) #35402(4th) #35502(5th) #35602(6th) #35702(7th) #35802(8th) #35902(9th) #36002(10th) #36102(11th) #36202(12th)	#13006	#12006	#14006	#15006
…	…	…	…	…	…	…	…	…

96	#11286(1st) #11287(2nd) #11288(3rd) #11686(4th) #11687(5th) #11688(6th)	#31196(1st) #31296(2nd) #31396(3rd) #31496(4th) #31596(5th) #31696(6th) #31796(7th) #31896(8th) #31996(9th) #32096(10th) #32196(11th) #32296(12th)	#10286(1st) #10287(2nd) #10288(3rd) #10686(4th) #10687(5th) #10688(6th)	#35196(1st) #35296(2nd) #35396(3rd) #35496(4th) #35596(5th) #35696(6th) #35796(7th) #35896(8th) #35996(9th) #36096(10th) #36196(11th) #36296(12th)	#13288	#12288	#14288	#15288
Remarks	• All compensations of tool 0 are 0 • Software version before 10.116.34, provide tool compensation function for first 6 axis, variable #10000~#15999, which have to be linear axis • After software version 10.116.34 and 10.116.34 included, provides tool compensation function for first 12 axis, variable #30000~#39999, which have to be linear axis • Tool compensation function of first 12 axis is only supported by lathe system • Data type of all variables above is Double • It requires customizing the corresponding tool table compensation screen for multi-axis compensation on mill machine system • Only supports the variables listed in the table							

Pr3816 set 3

Multi-Axis Tool Table

Number	Tool Length Compensation (H)		Cutter Radius Compensation (D)			
	Geometric Compensation	**Worn Out Compensation**	**Geometric Compensation**	**Worn Out Compensation**	**Tool Nose Direction**	**Tool Nose Angle**

1	#31101(1st) #31201(2nd) #31301(3rd) #31401(4th) #31501(5th) #31601(6th) #31701(7th) #31801(8th) #31901(9th) #32001(10th) #32101(11th) #32201(12th)	#35101(1st) #35201(2nd) #35301(3rd) #35401(4th) #35501(5th) #35601(6th) #35701(7th) #35801(8th) #35901(9th) #36001(10th) #36101(11th) #36201(12th)	#13001	#12001	#14001	#15001
2	#31102(1st) #31202(2nd) #31302(3rd) #31402(4th) #31502(5th) #31602(6th) #31702(7th) #31802(8th) #31902(9th) #32002(10th) #32102(11th) #32202(12th)	#35102(1st) #35202(2nd) #35302(3rd) #35402(4th) #35502(5th) #35602(6th) #35702(7th) #35802(8th) #35902(9th) #36002(10th) #36102(11th) #36202(12th)	#13002	#12002	#14002	#15002
…	…	…	…	…	…	…
96	#31196(1st) #31296(2nd) #31396(3rd) #31496(4th) #31596(5th) #31696(6th) #31796(7th) #31896(8th) #31996(9th) #32096(10th) #32196(11th) #32296(12th)	#35196(1st) #35296(2nd) #35396(3rd) #35496(4th) #35596(5th) #35696(6th) #35796(7th) #35896(8th) #35996(9th) #36096(10th) #36196(11th) #36296(12th)	#13096	#12096	#14096	#15096

Remarks	• All compensations of tool 0 are 0 • Provides tool compensation function for first 12 axis, variable #30000~#39999, needs to be linear axis • Data type of all variables above is Double • Only supports the variables listed in the table

3.9 Workpiece Coordinate System Offset Value, #20001~#**22018**

Number	Descriptions	R/W Rule	Data Type
#20001~ #20018	Offset value of offset coordinate system	R/W	Double
#20021~ #20038	G54(G54P1) coordinate system offset value	R/W	Double
#20041~ #20058	G55(G54P2) coordinate system offset value	R/W	Double
…	…	R/W	Double
#20121~ #20138	G59(G54P6) coordinate system offset value	R/W	Double
#20141~ #20158	G59.1(G54P7) coordinate system offset value	R/W	Double
…	…	R/W	Double
#20301~ #20318	G59.9(G54P15) coordinate system offset value	R/W	Double
#20321~ #20338	G54P16 coordinate system offset value	R/W	Double
…	…	R/W	Double
#20641 ~#20658	G54P32 coordinate system offset value	R/W	Double
...	...	R/W	Double

Number	Descriptions	R/W Rule	Data Type
#22001 ~#22018	G54P100 coordinate system offset value	R/W	Double
Remarks	• Each coordinate system corresponds to 18 axis • Modifying workpiece coordinate system variables (#20001~#20658) of other paths takes effect after Reset		

3.10 Reference Point Position, #26001~#26078

Number	Descriptions	R/W Rule	Data Type
#26001~ #26018	1st reference point of each axis	R	Double
#26021~ #26038	2nd reference point of each axis, corresponds to Pr2801~Pr2818	R	Double
#26041~ #26058	3rd reference point of each axis, corresponds to Pr2821~Pr2838	R	Double
#26061~ #26078	4th reference point of each axis, corresponds to Pr2841~Pr2858	R	Double
Remarks	• Each reference point position can correspond to 18 axis • The position of 1st reference point is the origin		