Campro Precision Machinery Co., Ltd.

凱柏精密機械股份有限公司

TROUBLESHOOTING MANUAL

VERTICAL MACHINING CENTER

HEIDENHAIN CNC iTNC530 HSCI Series

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料號: BK07-530HSCI-TA01A

CONTENT

COMPATIBLE PRODUCT：

MACHINE MODEL	CNC CONTROLLER
CPV-550	**HEIDENHAIN** **iTNC530 HSCI SERIES**
CPV-750	
CPV-900	
CPV-1100	
CPV-1300	
CPV-850B	
CPV-1100B	
CPV-1200B	
CPV-1400B	
CPV-1600B	
CQV-900	
CQV-1100	
CQV-1300	

2.1 Alarm No.00 ~ 19

Alarm Message	Causes and Troubleshooting
00 **Circuit breaker** (PLC Address: M4800)	Causes : 1. Overload of protective motor switch 2. Motor defective Troubleshooting : 1. Check electrical cabinet 2. Electrical motor check
01 **Temperature drive / inverter** (PLC Address: M4801)	Causes : 1. Overload of drives 2. Filter of fan contaminated 3. Fan in switch cabinet defective Troubleshooting : 1. Check motor temperature 2. Change filter 3. Check if the fan functions
02 **Hydraulic pressure** (PLC Address: M4802)	Causes : 1. No pressure build-up in hydraulic 2. Pressure tubings leaky 3. Pressure switch defective Troubleshooting : 1. Visual inspection for oil loss 2. Electrical connection of pressure switch
03 **Pneumatic pressure** (PLC Address: M4803)	Causes : 1. Pressure tubings leaky 2. Pressure switch defective Troubleshooting : 1. Visual inspection of pressure tubings 2. Check the pressure switch

Alarm Message	Causes and Troubleshooting
04 **PW 210 temperature max** (PLC Address: M4804)	Causes : Brake overload drives Troubleshooting : 1. Optimize machine parameters 2. Reduce feed rate
05 **DA300 pressure** (PLC Address: M4805)	Causes : 1. Pressure tubings leaky 2. Pressure switch defective Troubleshooting : 1. Change filter 2. Visual inspection of pressure tubings 3. Check the pressure switch
06 **Power supply drives** (PLC Address: M4806)	Causes : Supply and recover unit not operational Troubleshooting : 1. Check supply and recover unit 2. Check connection PLC input 3. Siemens SIMODRIVE 611 ER module (X111 72-73.1) 4. Indramat Power Drive supply unit HVE (X7 3-4)
09 **Machine guard is closed !** (PLC Address: M4809)	Causes : 1. Guards not opened 2. Sensors defective Troubleshooting : 1. Open guards 2. Check sensors

Alarm Message	Causes and Troubleshooting
10 **Machine guard is open !** (PLC Address: M4810)	Causes : 1. Guards not closed 2. Sensors defective Troubleshooting : 1. Close guards 2. Check sensors
11 **Coolant level low** (PLC Address: M4811)	Causes : Coolant level too low Troubleshooting : Refill coolant
12 **Lubricating axes** (PLC Address: M4812)	Causes : 1. Lubrication cycle of axes not carried out correctly 2. Pressure tubings leaky 3. Pressure switch defective Troubleshooting : 1. Visual inspection for oil loss 2. Electrical connection of pressure switch
13 **Lubrication oil level low** (PLC Address: M4813)	Causes : 1. Oil level of central lubrication system too low 2. Level switch defective Troubleshooting : 1. Refill oil 2. Check the level switch

Alarm Message	Causes and Troubleshooting
17 **Central drive** (PLC Address: M4817)	Causes : Several axes with central drive were started at the same time Troubleshooting : 1. Change NC program 2. Each NC block must include only one axis with central drive. 3. Axis keys for central drive axes should not be pressed simultaneously.
18 **Positioning error TC magazine** (PLC Address: M4818)	Causes : 1. Tool magazine blocked 2. Tool magazine loaded differently 3. Axes optimization faulty Troubleshooting : 1. Check tool availability 2. Optimize axes
19 **Axis motion from end position** (PLC Address: M4819)	Causes : Axis has released the emergency stop limit-switch of hardware Troubleshooting : (1) Select Manual operating mode (2) Press "Retract" button (3) Switch control on (4) Clear error message Emergency stop (CE key) (5) Retract with direction keys (see note)

2.2 Alarm No.20 ~ 39

Alarm Message	Causes and Troubleshooting
20 **Clamping/unclamping axis [->]** (PLC Address: M4820)	Causes : 1. Sensors for clamping/releasing defective 2. Pressure drop of pneumatic/hydraulic system 3. [->] Additional note in PLC window: Wrong axis Troubleshooting : 1. Check sensors and re-adjust them if required 2. Check compressed-air and hydraulic pressure
21 **Axis not in hirth position** (PLC Address: M4821)	Causes : 1. Axis not in Hirth position 2. Axis movement was interrupted Troubleshooting : 1. Encoder loose 2. Compensate reference mismatch via MP960 3. Position the axis in manual operating mode on Hirth grid
22 **Nominal position not in hirth** (PLC Address: M4822)	Causes : Programmed target position not in Hirth grid Troubleshooting : Compensate NC program
23 **Drives not operational** (PLC Address: M4823)	Causes : 1. Axis drive not ready 2. [->] Additional note in PLC window: Wrong axis Troubleshooting : 1. Check hardware of axis drive, regard diagnosis LED 2. Switch unit on/off

Alarm Message	Causes and Troubleshooting
24 **Power stage temperature max** (PLC Address: M4824)	Causes : 1. Overload of servo drive controller 2. Filter cloth contaminated Troubleshooting : 1. Reduce feed rate 2. Check / change filter cloth
25 **Drives temperature max** (PLC Address: M4825)	Causes : Overload of servo drives Troubleshooting : 1. Check temperature of motors 2. Reduce feed rate 3. Switch unit on/off
26 **Axes i2t pre-warning** (PLC Address: M4826)	Causes : Overload of servo drives Troubleshooting : 1. Reduce feed rate 2. Select smaller tools
27 **Axes i2t limitation** (PLC Address: M4827)	Causes : Overload of servo drives Troubleshooting : 1. Reduce feed rate 2. Select smaller tools

Alarm Message	Causes and Troubleshooting
28 **Spindle not operational** (PLC Address: M4828)	Causes : 1. Overload of spindle 2. Controller expansion of spindle defective 3. Spindle motor defective Troubleshooting : 1. Reduce feed rate 2. Check controller expansion 3. Check spindle motor 4. Check cable / screwed connection
29 **Spindle nominal rpm** (PLC Address: M4829)	Causes : Nominal speed not reached or too low Troubleshooting : 1. Reduce feed rate 2. Select smaller tools 3. Check speed with oscilloscope 4. Optimize machine parameters
30 **Spindle stand still monitor** (PLC Address: M4830)	Causes : 1. Offset too high, spindle drifts 2. Encoder or cable defective Troubleshooting : 1. Compensate offset (analog) 2. Check encoder (oscilloscope) 3. Check cable 4. Optimize machine parameters
31 **Spindle I max** (PLC Address: M4831)	Causes : 1. Overload of spindle motor 2. Fan of spindle motor contaminated Troubleshooting : 1. Reduce cutting values 2. Clean the fan of spindle motor

Alarm Message	Causes and Troubleshooting
32 **Spindle T max (sensor Pt100)** (PLC Address: M4832)	Causes : 1. Excessive temperature in spindle bearing 2. Pt 100 temperature sensor defective Troubleshooting : 1. Reduce spindle speed 2. Check Pt 100 temperature sensor
33 **Spindle max torque** (PLC Address: M4833)	Causes : Maximum permissible torque exceeded Troubleshooting : 1. Reduce feed rate 2. Increase spindle speed 3. Select smaller tools 4. Optimize machine parameters
34 **Touch probe in spindle !** (PLC Address: M4834)	Causes : M03, M04, M05, M13, M14 only permissible if there is no touch probe in the spindle. (no Probe in the PLC window) Troubleshooting : 1. Change the tool (with PLC status %00000000) PLC status for code of tool type %00000000 = normal tool %00000001 = touch probe
35 **Touch probe not in spindle !** (PLC Address: M4835)	Causes : Probe function selected but no touch probe in the spindle (Probing must take place in the PLC window) Troubleshooting : 1. Change the touch probe PLC status for code of tool type %00000000 = normal tool %00000001 = touch probe

Alarm Message	Causes and Troubleshooting
37 **Gear change** (PLC Address: M4837)	Causes : The selected gear range cannot be coupled Troubleshooting : 1. Check sensors for the gear ranges 2. Clear error message (CE key) and retry
38 **Tool not clamped !** (PLC Address: M4838)	Causes : 1. Tool change interrupted 2. Tool unclamped 3. Sensors or cables defective Troubleshooting : 1. Press the key "Clamp tool" 2. Check the sensors
39 **Tool unclamping, please !** (PLC Address: M4839)	Causes : 1. Call of Manual tool change 2. Tool clamped Troubleshooting : 1. Press the key "Unclamp tool" 2. Remove the tool

Alarm No.40 ~ 59

Alarm Message	Causes and Troubleshooting
40 **Tool clamping, please !** (PLC Address: M4840)	Causes : 1. Call of Manual tool change 2. Tool unclamped Troubleshooting : 1. Press the key "Clamp tool" 2. Insert the tool
41 **TC quit, please !** (PLC Address: M4841)	Causes : 1. Call of Manual tool change 2. Tool change carried out Troubleshooting : Press the key "Confirm tool change"
42 **Close guard -> TC quit !** (PLC Address: M4842)	Causes : 1. Call of Manual tool change 2. Tool change carried out Troubleshooting : 1. Close the guard 2. Press the key "Confirm tool change"
43 **TC end -> NC start** (PLC Address: M4843)	Causes : 1. Call of Manual tool change 2. Tool change carried out Troubleshooting : Press the key NC start
44 **Check pocket table !** (PLC Address: M4844)	Causes : 1. Interruption during tool change 2. It is possible that the pocket table does not correspond to the loading of the magazine Troubleshooting : Check/correct the pocket table

Alarm Message	Causes and Troubleshooting
45 **Correct tool in spindle ?** (PLC Address: M4845)	Causes : The tool was unclamped without TOOL CALL Troubleshooting : 1. Check if the tool stated in the status is in the spindle and if it may be placed in the magazine 2. NC start to carry out the tool change 3. NC stop to interrupt the tool change
46 **Spindle is empty !** (PLC Address: M4846)	Causes : 1. No tool available in the spindle 2. Sensor defective Troubleshooting : 1. Insert the tool 2. Check the sensor
47 **Spindle is not empty !** (PLC Address: M4847)	Causes : 1. There is a tool in the spindle although P0 in the pocket table is empty 2. Sensor defective Troubleshooting : 1. Remove the tool from the spindle 2. Check the sensor
48 **Tool call T0 necessary !** (PLC Address: M4848)	Causes : 1. Special function in case of tool change of tools with and without magazine pocket 2. Can be activated via MP Troubleshooting : Change the NC program. First the tool must be removed from the spindle (TOOL CALL 0) before a new tool is inserted.

Alarm Message	Causes and Troubleshooting
49 **Tool not in tolerance** (PLC Address: M4849)	Causes : Tolerance in tool table exceeded! Troubleshooting : Check the tool
50 **Tool life maximum** (PLC Address: M4850)	Causes : Tool life in tool table exceeded! Troubleshooting : 1. Check the tool 2. Set the current tool life to 0
51 **Tool change basic position** (PLC Address: M4851)	Causes : 1. Tool change interrupted 2. Error during tool change Troubleshooting : 1. Bring the tool in the manual operating mode in normal position by means of the service function (Help) 2. Test the inputs
52 **Tool change timeout** (PLC Address: M4852)	Causes : 1. Timeout during tool change 2. Interruption of tool change Troubleshooting : 1. Press NC start key to continue the tool change 2. Press internal stop soft key to stop the tool change
53 **TC magazine guard open !** (PLC Address: M4853)	Causes : Magazine guard open Troubleshooting : Close the tool magazine guard

Alarm Message	Causes and Troubleshooting
54 **TC magazine reference** (PLC Address: M4854)	Causes : Tool magazine without reference Troubleshooting : NC start to reference the tool magazine
55 **TC magazine timeout** (PLC Address: M4855)	Causes : 1. Timeout when positioning the tool magazine 2. Tool change interrupted Troubleshooting : 1. Press NC start key to continue tool change 2. Press internal stop soft key to interrupt tool change
56 **TC magazine loading active !** (PLC Address: M4856)	Causes : 1. Loading of the tool magazine selected via soft key 2. Tool magazine can be traversed and loaded Troubleshooting : Only note
57 **TC magazine pocket not empty** (PLC Address: M4857)	Causes : 1. Tool magazine loaded wrongly 2. Erroneous entries in the pocket table 3. Sensor defective Troubleshooting : 1. Load the tool magazine correctly 2. Check the pocket table 3. Check the sensor

Alarm Message	Causes and Troubleshooting
58 **TC magazine pocket is empty** (PLC Address: M4858)	Causes : 1. Tool magazine loaded wrongly 2. Erroneous entries in the pocket table 3. Sensor defective Troubleshooting : 1. Load the tool magazine correctly 2. Check the pocket table 3. Check the sensor
59 **Tool in spindle wrong** (PLC Address: M4859)	Causes : 1. Block scan was stopped 2. Different tools in status line and spindle Troubleshooting : In the MDI operating mode, insert the tool displayed in the status line

2.4 Alarm No.60 ~ 79

Alarm Message	Causes and Troubleshooting
60 **Alternating table timeout** (PLC Address: M4860)	Causes : The alternating table cycle started with M61/M62 was interrupted Troubleshooting : 1. Press NC start key to continue the alternating table cycle 2. Press internal stop soft key to interrupt the alternating table cycle
61 **Enable table 1 !** (PLC Address: M4861)	Causes : M61 starts the NC processing on page 1 (left) but the release key (probe) has not been pressed Troubleshooting : Press the key Alternating table mode on page 1 (left)
62 **Enable table 2 !** (PLC Address: M4862)	Causes : M62 starts the NC processing on page 2 (right) but the release key (probe) has not been pressed Troubleshooting : Press the key Alternating table mode on page 2 (right)
63 **Alternating table not active** (PLC Address: M4863)	Causes : M61 or M62 call the alternating table cycle although is has not been activated (soft key or sensor dividing wall) Troubleshooting : Activate the alternating operation by means of soft key or mounted dividing wall
64 **Alternating table X position** (PLC Address: M4864)	Causes : When trying to select the alternating table operation, the X axis was in the range of the dividing wall Troubleshooting : Traverse the X axis from the middle in direction table 1/2

Alarm Message	Causes and Troubleshooting
65 **3D head timeout** (PLC Address: M4865)	Causes : 1. Timeout during 3D head positioning 2. Interruption of 3D head positioning Troubleshooting : 1. NC start key to continue the 3D head positioning 2. Internal stop soft key to stop the 3D head positioning 3. Service menue 3D head in manual mode
66 **3D head set reference** (PLC Address: M4866)	Causes : 3D head reference settings not jet made Troubleshooting : Set reference on service menue 3D head according to the axes position
67 **3D head G range 1 necessary !** (PLC Address: M4867)	Causes : 3D head positioning only in gear range 1 possible Troubleshooting : Select spindle rpm on 1st gear range TOOL CALL Sxxx
68 **Spindle cooler system alarm** (PLC Address: M4868)	Causes : Spindle cooler system not ready Troubleshooting : To check spindle cooler system
69 **CTS_level_alarm** (PLC Address: M4869)	Causes : 1. High level sensor of Main tank keep "OFF" too long. 2. Low level sensor of Sub tank keep "OFF" too long. ※Liquid of Main tank can't decrease or Liquid of Sub tank can't increase in desired time. Troubleshooting : Check liquid level senor and pump.

Alarm Message	Causes and Troubleshooting
70 **coolant_overflow** (PLC Address: M4870)	Causes : Both High level sensor of Main and Sub tank are all "0" at the same time. Troubleshooting : Decrease water level of Sub tank.
71 **coolant_tank_sensor_err** (PLC Address: M4871)	Causes : 1. Both High level sensor and Low level sensor signals of Main tank are "0". 2. Both High level sensor and Low level sensor signals of Sub tank are "0". Troubleshooting : Check liquid level sensor.
72 **Filter_choked** (PLC Address: M4872)	Causes : Filter choked Troubleshooting : change filter
73 **The coolant is empty** (PLC Address: M4873)	Causes : 1. The coolant is empty 2. The main tank low sensor is defected Troubleshooting : 1. Please add coolant 2. Please check sensor
74 **Tool pocket error** (PLC Address: M4874)	Causes : Both Pocket In/Out Sensor are ON Troubleshooting : Check pocket In/Out Sensor

Alarm Message	Causes and Troubleshooting
75 **Special mode** (PLC Address: M4875)	Causes : Switch on special mode key & press confirm button Troubleshooting : Only note
76 **CTS pressure low** (PLC Address: M4876)	Causes : CTS pressure switch not on when sprayed. Troubleshooting : Check the CTS pressure whether is normal.

2.5 Alarm No.80 ~ 99

Alarm Message	Causes and Troubleshooting
81 **Monitoring working area off !** (PLC Address: M4881)	Causes : Monitoring of the working area switched off by soft key or M32. Caution collision axes are possible. Troubleshooting : Only note
82 **Protected working area !** (PLC Address: M4882)	Causes : 1. Axes are in a range of collision. 2. In automatic mode axes are stopped, if the distance to go point at a collision range. Troubleshooting : Only note
83 **Emergency stop after END PGM** (PLC Address: M4883)	Causes : The switching off of the machine after the next END PGM block was activated via user parameters Troubleshooting : Only note
84 **Reference necessary** (PLC Address: M4884)	Causes : The reference operating mode is necessary to carry out Function Troubleshooting : Select the operating mode Reference via soft key
85 **Restore machine status ?** (PLC Address: M4885)	Causes : Output of M functions after block scan to activate the current machine status Troubleshooting : 1. Press NC start to continue 2. Press NC stop to interrupt

Alarm Message	Causes and Troubleshooting
86 **Temperature compensation** (PLC Address: M4886)	Causes : Error occurred with temperature compensation by means of Pt100 sensors Troubleshooting : Observe the information regarding the error reason in the small PLC window
87 **PLC stack not empty !** (PLC Address: M4887)	Causes : 1. Debug note for PLC programmers 2. Files were pushed into the stack and were not pulled Troubleshooting : Change the PLC program
88 **I'm reading MP's ...** (PLC Address: M4888)	Causes : 1. With the first PLC scan or after changes the machine parameters are read in order to adapt the PLC functions 2. Only after termination of this process can the machine be started Troubleshooting : Only note
89 **M00 programmed stop** (PLC Address: M4889)	Causes : 1. Program interruption caused by M00 2. Press NC start to continue Troubleshooting : Only note
90 **M01 conditional stop** (PLC Address: M4890)	Causes : 1. Program interruption caused by M01 2. Press NC start to continue Troubleshooting : Only note

Alarm Message	Causes and Troubleshooting
91 **M03/M04 or M19/M20 necessary** (PLC Address: M4891)	Causes : 1. To move axes at machining feed rate, one of the mentioned M commands must be active 2. M31 switches off the function temporarily until the next END PGM 3. Function can be deselected permanently via MP Troubleshooting : 1. Press NC stop / TNC stop 2. Correct the NC program
92 **M function not used** (PLC Address: M4892)	Causes : Programmed M command is not supported by the PLC program Troubleshooting : 1. Press NC stop / TNC stop 2. Correct NC program
93 **Feed poti = 0 !** (PLC Address: M4893)	Causes : Program start with turned off feed rate potentiometer Troubleshooting : Increase the feed rate on the feed-rate potentiometer
94 **Function ok !** (PLC Address: M4894)	Causes : 1. The active step of a HELP file was carried out properly 2. Initiator sensors correct Troubleshooting : Only note
95 **Check machine parameter !** (PLC Address: M4895)	Causes : The machine parameter setting is not supported by the PLC program Troubleshooting : 1. Change the machine parameter 2. Observe the information regarding the error reason in the small PLC window

Alarm Message	Causes and Troubleshooting
96 **<spg_simu.plc> only for test!** (PLC Address: M4896)	Causes : Debug function activated by means of control test unit, although due to the I/O assignment a real machine can be presumed Troubleshooting : Edit config.def (SPG & inactive)
97 **Submit/Spawn queue full** (PLC Address: M4897)	Causes : It was tried to enter more than 8 jobs in the submit or spawn queue Troubleshooting : Contact your machine tool builder
98 **TNC programming station** (PLC Address: M4898)	Causes : 1. TNC programming station selected (MP7210). 2. Axes and spindle are not controlled. 3. Caution ! If PLC as active selected (MP7210=1), machine functions on simulated axes and spindle positions can be started. Troubleshooting : Special functions key combination TExx0 - Keys [Ctrl] + S -> NC start - Keys [Ctrl] + X -> NC stop - Keys [Ctrl] + Cursor up -> axes plus - Keys [Ctrl] + Cursor down -> axes minus - Keys [Alt] + X -> Emergency stop PC keyboard or mouse support possible - Keys [Shift]+[Ctrl]+[Alt]+1 -> vertical soft key 1 ... - Keys [Shift]+[Ctrl]+[Alt]+6 -> vertical soft key 6
99 **Message in PLC window** (PLC Address: M4899)	Causes : Further notes are displayed in the PLC window Troubleshooting : 1. Press CE to clear the display 2. Press CE to display the next information (if available)

2.6 Alarm No.100 ~ 119

Alarm Message	Causes and Troubleshooting
100 **Logbook writing** (PLC Address: M4900)	Causes : Data cannot be written to logbook Troubleshooting : 1. Too much submit jobs active 2. Create data buffer in PLC memory (PLC application)
101 **Value not permissible** (PLC Address: M4901)	Causes : Function can not be activated because the values are not in the permissible data range Troubleshooting : Check FN19, M-function and modify values.
102 **PLC Module %d** (PLC Address: M4902)	Causes : PLC module 9xxx has created an error Troubleshooting : 1. Additional information in line 2 2. Please see also module description 3. Send message to OEM

3.1 PLC Bit Selections

#	Bit	Description	Default
MP 4310.1	+$0001 (M4316)	No spindle stop with key NC stop. 0：Invalid 1：Valid	0
MP 4310.1	+$0002 (M4317)	TNC shut down after END PGM, if AUTO POWER OFF active. 0：Invalid 1：Valid	0
MP 4310.1	+$0004 (M4318)	Coolant without spindle turn. 0：Invalid 1：Valid	0
MP 4310.1	+$0008 (M4319)	Power fail inactive. 0：Invalid 1：Valid	0
MP 4310.2	+$0001 (M4332)	Start-up procedure active. 0：Invalid 1：Valid	0
MP 4310.2	+$0002 (M4333)	Guard inactive. 0：Invalid 1：Valid	0
MP 4310.2	+$0004 (M4334)	M3/M4/M19 monitoring for milling feed rate inactive. 0：Invalid 1：Valid	0
MP 4310.2	+$0008 (M4335)	Alternate table / pallet change inactive. 0：Invalid 1：Valid	1

#	Bit	Description	Default
MP 4310.2	+$0010 (M4336)	Reference automatically inactive. 0：Invalid 1：Valid	0
MP 4310.2	+$0020 (M4337)	NC soft key inactive. 0：Invalid 1：Valid	0
MP 4310.2	+$0040 (M4338)	Tool in spindle not monitored. 0：Invalid 1：Valid	1
MP 4310.2	+$0080 (M4339)	Tool in magazine not monitored. 0：Invalid 1：Valid	1
MP 4310.2	+$0100 (M4340)	T0 required for T-auto <-> T-manual. 0：Invalid 1：Valid	0
MP 4310.2	+$0200 (M4341)	Tool change position manual inactive. 0：Invalid 1：Valid	1
MP 4310.2	+$0400 (M4342)	Automatic guard unlock on END_PGM, M02, M30. 0：Invalid 1：Valid	0
MP 4310.2	+$0800 (M4343)	Display standby pocket number inactive. 0：Invalid 1：Valid	0
MP 4310.2	+$1000 (M4344)	Diagnosis function active. 0：Invalid 1：Valid	0

#	Bit	Description	Default
MP 4310.2	+$2000 (M4345)	TC magazine load T0 necessary. 0：Invalid 1：Valid	0
MP 4310.2	+$4000 (M4346)	PLC preset TNC:\DATUM\PRESET.TAB active. 0：Invalid 1：Valid	0
MP 4310.2	+$8000 (M4347)	Spindle torque monitoring inactive. 0：Invalid 1：Valid	0
MP 4310.3	+$0001 (M4348)	Fast arm system active. 0：Invalid 1：Valid	0
MP 4310.3	+$0002 (M4349)	Tool change X, Y axes moving active. 0：Invalid 1：Valid	1
MP 4310.3	+$0004 (M4350)	Coolant CTS system active. 0：Invalid 1：Valid	0
MP 4310.3	+$0008 (M4351)	Without magazine exact stop signal. 0：Invalid 1：Valid	Arm：0/1 Carrousel：1
MP 4310.3	+$0010 (M4352)	CTS sub tank level integration. 0：Invalid 1：Valid	1

#	Bit	Description	Default
MP 4310.3	+$0020 (M4353)	TC magazine counter N.O contact. 0：Invalid 1：Valid	Arm： 0 Carrousel： 1
MP 4310.3	+$0040 (M4354)	TC HELP handwheel active in tool clamped. 0：Invalid 1：Valid	0
MP 4310.3	+$0080 (M4355)	Oil skimmer active. 0：Invalid 1：Valid	0
MP 4310.3	+$0100 (M4356)	CTS spray pressure s.w active. 0：Invalid 1：Valid	0
MP 4310.3	+$0200 (M4357)	Chip conveyor stop button active. 0：Invalid 1：Valid	1
MP 4310.4	+$0001 (M4364)	Water gun active. 0：Invalid 1：Valid	0
MP 4310.4	+$0010 (M4368)	Spindle oil system active. 0：Invalid 1：Valid	0
MP 4310.4	+$0020 (M4369)	Non-C.E active 0：Invalid 1：Valid	0

＊：Adjustment in reality

4.1 Runtime for PLC Timers T0..T47

#	Address	Description	Default
MP 4110.0	T0	'Timer 250ms'	0.25 Unit : S
MP 4110.1	T1		0 Unit : S
MP 4110.2	T2		0 Unit : S
MP 4110.3	T3		0 Unit : S
MP 4110.4	T4		0 Unit : S
MP 4110.5	T5		0 Unit : S
MP 4110.6	T6		0 Unit : S
MP 4110.7	T7	'Spindle delayed stop (automatic mode)'	0.25 Unit : S
MP 4110.8	T8	'Switch off axes -t-> axis monitoring off/on'	0.5 Unit : S
MP 4110.9	T9	'Servo drives ready'	4 Unit : S
MP 4110.10	T10	'Spindle speed change'	10 Unit : S
MP 4110.11	T11	'Servo drive release spindle'	0.25 Unit : S
MP 4110.12	T12	'Timeout gear' The longest time when the spindle gear shifts.	10 Unit : S
MP 4110.13	T13	'Gear jog, general timer' The operating time of the spindle c.w when the spindle gear shifts. (For the 'ZF gear box')	1 Unit : S

＊：Adjustment in reality

#	Address	Description	Default
MP 4110.14	T14	'Gear jog ccw' The operating time of the spindle c.c.w when the spindle gear shifts. (For the 'ZF gear box')	0.3 Unit : S
MP 4110.15	T15	'Tool magazine, definite stop' Arm Type： This timer is used for following two uses : 1. The delay time after the magazine cw/ccw stops. 2. The delay time after the pot moves up. Carrousel Type： The delay time after the magazine cw/ccw stops.	Arm： 0.5 Carrousel： 0.15 Unit : S
MP 4110.16	T16	'Tool magazine timeout' The longest time when the magazine searches tool.	Arm： 30 Carrousel： 20 Unit : S
MP 4110.17	T17	'Tool magazine, general timer ' The time that delay the magazine cw/ccw stop.	Arm： 0.04 Carrousel： 0.05 Unit : S
MP 4110.18	T18	'Tool changer timeout' The longest time when the arm exchanges tool.	10 Unit : S
MP 4110.19	T19	'Tool changer, general timer' Arm Type： This timer is used for following two uses : 1. The delay time after the spindle unclamps tool. 2. The delay time after the pot moves down. Carrousel Type： This timer is used for following two uses : 1. The delay time after the spindle unclamps tool. 2. The delay time after the magazine moves to right side.	Arm： 0.15 Carrousel： 0.5 Unit : S

＊：Adjustment in reality

#	Address	Description	Default
MP 4110.20	T20	‘Lubrication, general (delayed off, test pressure 0)’ The operating time of the lubrication actives.	15 Unit : S
MP 4110.21	T21	‘Lubrication, pressure generation (sensor)’ The time that check the pressure sensor of the lubrication.	15 Unit : S
MP 4110.22	T22	‘Hydraulic system, pressure generation’	10 Unit : S
MP 4110.23	T23	‘Timeout alternating table’	10 Unit : S
MP 4110.24	T24	‘Start index table’	1 Unit : S
MP 4110.25	T25	‘Tool changing arm cam middle position -t -> stop’	0.25 Unit : S
MP 4110.26	T26	‘Pallet changer timeout‘	50 Unit : S
MP 4110.27	T27	‘Pallet changer general timer’	0.15 Unit : S
MP 4110.28	T28	‘3D head timeout’	10 Unit : S
MP 4110.29	T29	‘3D head, general timer’	0.5 Unit : S
MP 4110.30	T30	‘Wye/delta changing timer’	0.05 Unit : S
MP 4110.31	T31	‘Fast tool change clamping delay’ The time that delay the spindle tool clamp after the arm tool clamp point sensor was detected.(For fast tool change mechanism)	0.1 Unit : S
MP 4110.32	T32	‘CTS main tank high level detect timer’ The operating time of the pump motor when the CTS main tank is full.	30 Unit : S

＊：Adjustment in reality

#	Address	Description	Default
MP 4110.33	T33	'CTS sub tank low level detect timer' The longest time of the pump motor actives when the CTS sub tank is low.	120 Unit : S
MP 4110.34	T34	'CTS main tank low level detect timer' The delay time that make sure the main tank whether is low or not.	10 Unit : S
MP 4110.35	T35	'CTS air blow clean' The operating time of the spindle air blows after the CTS off.	2 Unit : S
MP 4110.36	T36	'Gear output delay timer' The delay time after the spindle gear position signal was detected. (For the 'ZF gear box')	0.5 Unit : S
MP 4110.37	T37	'Gear finish timer' The delay time after the spindle gear shift output off. (For the 'ZF gear box')	0.5 Unit : S
MP 4110.38	T38	'OIL SKILMMER ON' The operating time of the oil skimmer on.	300 Unit : S
MP 4110.39	T39	'OIL SKIMMER OFF' The operating time of the oil skimmer off.	180 Unit : S
MP 4110.40	T40	'CTS PRESSURE DELAY' The inspection delay time of CTS pressure when sprays.	5 Unit : S
MP 4110.41	T41		0 Unit : S
MP 4110.42	T42		0 Unit : S
MP 4110.43	T43		0 Unit : S

＊：Adjustment in reality

#	Address	Description	Default
MP 4110.44	T44		0 Unit : S
MP 4110.45	T45		0 Unit : S
MP 4110.46	T46	‘Control voltage on -t-> off’	1.5 Unit : S
MP 4110.47	T47	‘Control voltage off -t-> on’	1.5 Unit : S

MP 4310.6		‘Intervals for axis lubrication’ Lubrication stand-by time.	6 Unit : min

＊：Adjustment in reality

5.1 PLC General values (D768 to D956)

#	Format	Description	Default
MP 4210.0	BCD	‘Feed PLC pos X’ The maximum feed rate that the X axis moves to tool change point during executing tool change.	＊
MP 4210.1	BCD	‘Feed PLC pos Y’ The maximum feed rate that the Y axis moves to tool change point during executing tool change.	＊
MP 4210.2	BCD	‘Feed PLC pos Z’ The maximum feed rate that the Z axis moves to tool change point during executing tool change.	＊
MP 4210.3	BCD	‘Feed PLC pos 4’	+5000
MP 4210.4	BCD	‘Feed PLC pos 5’	+5000
MP 4210.5	BCD	‘Feed PLC pos 6’	+2000
MP 4210.6	BCD	‘Feed PLC pos 7’	+2000
MP 4210.7	BCD	‘Feed PLC pos 8’	+5000
MP 4210.8	BCD	‘Feed PLC pos 9’	+5000
MP 4210.9	BCD	‘Feed service’ The maximum feed rate of the axis when the guard was opened.	+2000
MP 4210.10	BCD	‘Tool change pos X’ The tool change position of X axis during executing tool change.	+0
MP 4210.11	BCD	‘Tool change pos Y out’	+100

＊：Adjustment in reality

#	Format	Description	Default
MP 4210.12	BCD	‘Tool change pos Y in’ The tool change position of Y axis during executing tool change.	+0
MP 4210.13	BCD	‘Tool change pos Z out’ Carrousel Type： The tool change position that Z axis moves up during executing tool change.	+0
MP 4210.14	BCD	‘Tool change pos Z in’ Arm Type： The tool change position of Z axis during executing tool change. Carrousel Type： The tool change position that Z axis moves down during executing tool change.	＊
MP 4210.15	BCD	‘Tool change pos spindle’ The shift amount of the spindle orientation.	+0
MP 4210.16	BCD	‘Tool change pos X manual’	-100
MP 4210.17	BCD	‘Tool change pos Y manual‘	-100
MP 4210.18	BCD	‘Tool change pos Z manual‘	+800
MP 4210.19	BCD	‘Tool change pos Z safe’	+1000
MP 4210.20	BCD	‘Feed rate for special operating mode’ The maximum feed rate of the axis in special mode when the guard door was opened.	+2000
MP 4210.21	BCD	‘Spindle n min [rpm]’	+6
MP 4210.22	BCD	‘Spindle n actl= noml [rpm; n < 100]’	+10

＊：Adjustment in reality

#	Format	Description	Default
MP 4210.23	BCD	‘Spindle n actl=noml [%; n > 100]’	+80
MP 4210.24	BCD	‘Spindle torque min [%]’	+10
MP 4210.25	BCD	‘Spindle torque max 0=from 1..150 [%]’	+150
MP 4210.26	BCD	‘Spindle factor feed limitation at max torque’	+1.5
MP 4210.27	BCD	‘Spindle rpm service’ The maximum speed of spindle when the guard door was opened.	+500
MP 4210.28	BCD	‘Spindle rpm reference’ The speed which the spindle returns to the reference mark.	+10
MP 4210.29	BCD	‘Spindle rpm special operating mode’ The maximum speed of spindle in special mode when the guard door was opened.	+100
MP 4210.30	BCD	‘Spindle temperature max. (Pt 100)’	+60
MP 4210.31	BCD	‘Spindle factor utilization bar diagram (S analog)’	+1
MP 4210.32	BCD	‘Spindle Y/delta connection current limit [A]’	+0
MP 4210.33	BCD	‘Temp. comp. factor [um/deg] at T(diff) 00..10 deg’	+0
MP 4210.34	BCD	‘Temp. comp. factor [um/deg] at T(diff) 10..20 deg’	+0
MP 4210.35	BCD	‘Temp. comp. factor [um/deg] at T(diff) 20..30 deg’	+0
MP 4210.36	BCD	‘Temp. comp. factor [um/deg] at T(diff) 30..40 deg’	+0

＊：Adjustment in reality

#	Format	Description	Default
MP 4210.37	BCD	‘Temp. comp. factor [um/deg] at T(diff) 40..50 deg’	+0
MP 4210.39	BCD	‘Pallet changer number of pallets’	+24
MP 4210.40	BCD	‘Minimum interval for axis lubrication [min]’ The minimum interval of the lubrication off.	+0
MP 4210.41	BCD	‘Maximum interval for axis lubrication [min]’ The maximum interval of the lubrication off.	+120
MP 4210.42	BCD	‘PLC module axes delay time [PLC cycles]’	+1
MP 4210.43	BCD	‘Alternating table limit X / Pallet position X’	+0
MP 4210.44	BCD	‘Alternating table position X1’	-100
MP 4210.45	BCD	‘Alternating table position X2’	+100
MP 4210.46	BCD	‘Alternating table position Y / Pallet position Y’	+200
MP 4210.47	BCD	‘Alternating table position Z / Pallet position Z’	+200

MP 4310.5	BCD	‘Screen color pallet [0..3]’	0

6.1 ARM TYPE：

1. Missing tool troubleshooting if generate the message "54 magazine reference"：

Troubleshooting：(Correct the magazine counter)

(1) Change to the “manual operating mode”.

(2) Press the soft key [T] at right side of monitor, and turn the soft key [MAG LOAD] on.

(3) Press the soft keys “MAG CW” or “MAG CCW” to turn the magazine to the NO.1 position.

(4) Select the [MOD] key on the keyboard and press the soft key [HELP] to enter the “HELP function”.

(5) Select the bar “#314 Magazine reference” in screen layout, and execute [START].

(6) Press the [END] key to quit “HELP function”.

(7) Complete.

2. Missing tool troubleshooting if the tool number in the pocket table doesn’t match the actual tool.

Troubleshooting：(Correct the magazine counter & initialize the pocket table)

(1) Change to the “manual operating mode”.

(2) Press the soft key [T] at right side of monitor, and turn the soft key [MAG LOAD] on.

(3) Press the soft keys “MAG CW” or “MAG CCW” to turn the magazine to the NO.1 position.

(4) Select the [MOD] key on the keyboard and press the soft key [HELP] to enter the “HELP function”.

(5) Select the bar “#314 Magazine reference” in screen layout, and execute [START].

(6) Select the bar “#315 Delete spindle status (T0)” in screen layout, and execute [START].

(7) Press the [END] key to quit “HELP function” and the message “44 check pocket table” appears.

(8) Enter the “pocket table“：
Soft key [TOOL TABLE] → [POCKET TABLE]

(9) Reset the “pocket table”：
Soft key [EDIT ON]→[RESET POCKET TABLE]→[ENT]

(10) Press the [END] key to quit and the message “44 check pocket table” disappears automatically.

(11) Complete.

****

6.2 CARROUSEL TYPE：

1. Missing tool troubleshooting if generate the message "54 magazine reference"：

Troubleshooting：(Correct the magazine counter)

(1) Change to the “manual operating mode”.

(2) Press the soft key [T] at right side of monitor, and turn the soft key [MAG LOAD] on.

(3) Press the soft keys “MAG CW” or “MAG CCW” to turn the magazine to the NO.1 position.

(4) Select the [MOD] key on the keyboard and press the soft key [HELP] to enter the “HELP function”.

(5) Select the bar “#110 Magazine reference” in screen layout, and execute [START].

(6) Press the [END] key to quit “HELP function”.

(7) Complete.

2. Missing tool troubleshooting if the tool number in the pocket table doesn’t match the actual tool.

Troubleshooting：(Correct the magazine counter & initialize the pocket table)

(1) Change to the “manual operating mode”.

(2) Press the soft key [T] at right side of monitor, and turn the soft key [MAG LOAD] on.

(3) Press the soft keys “MAG CW” or “MAG CCW” to turn the magazine to the NO.1 position.

(4) Select the [MOD] key on the keyboard and press the soft key [HELP] to enter the “HELP function”.

(5) Select the bar “#110 Magazine reference” in screen layout, and execute [START].

(6) Select the bar “#111 Delete spindle status (T0)” in screen layout, and execute [START].

(7) Press the [END] key to quit “HELP function” and the message “44 check pocket table” appears.

(8) Enter the “pocket table“：
Soft key [TOOL TABLE] → [POCKET TABLE]

(9) Reset the “pocket table”：
Soft key [EDIT ON]→[RESET POCKET TABLE]→[ENT]

(10) Press the [END] key to quit and the message “44 check pocket table” disappears automatically.

(11) Complete.

- **The arm sticks because power off, emergency stop or interruption during changing tool：**

  ※ **Attention : Don't move Z axis and the spindle.**

Troubleshooting：

(1) Release the emergency stop.

(2) NC power on.

(3) Close the guard door.

(4) Change to "manual operating mode".

(5) Select the [MOD] key on the keyboard and press the soft key [HELP] to enter "HELP function".

(6) Press the "CE" key to clear alarm messages.

(7) Move the bar up or down, a message will display on the top of screen layout. Described below：

  (a) "99 Message in PLC window"： it means this function can't be executed.

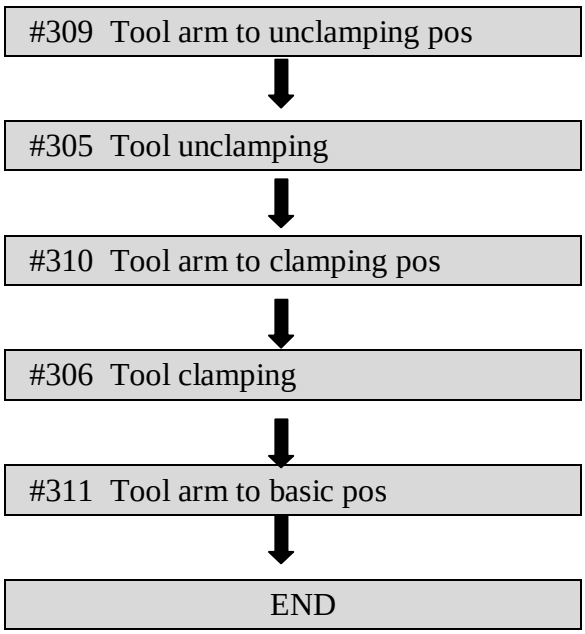
  (b) "Programming and editing"： it means this function can be executed with the [START] button.

  (c) "94 Function OK !"： it means this function is ready.

(8) Judge both of the position where the arm stops and the spindle is clamped or unclamped, then select the following one of these procedures "A...E" to troubleshooting：

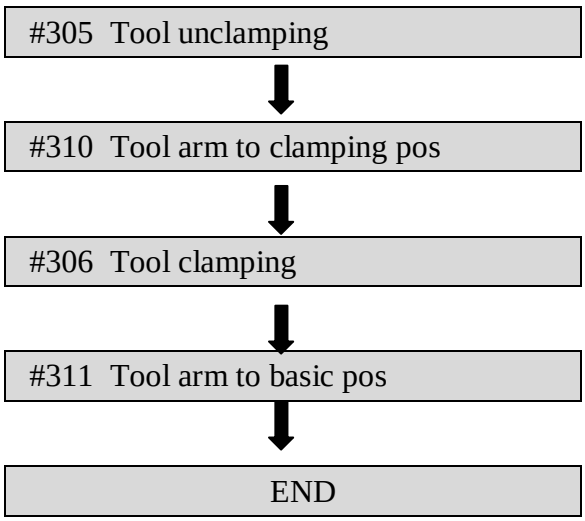
A. If the arm stops at the position before 60°(except 60° position.) and the spindle is clamped：

Procedure：



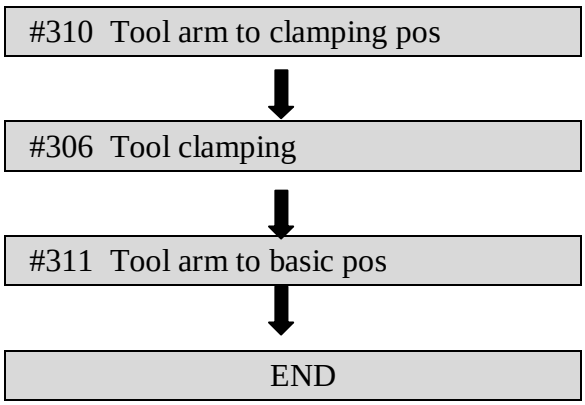
B. If the arm stops at the 60 ° position and the spindle is clamped：

Procedure：



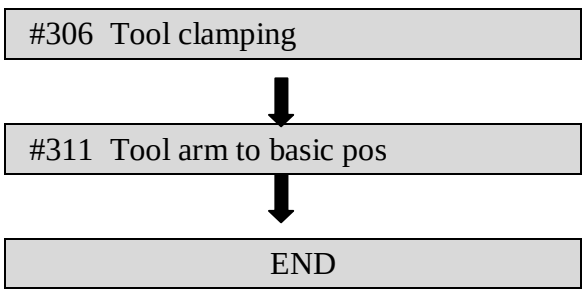
C. If the arm stops at the 60 ° position or at the 60 °~180° position and the spindle is unclamped：

Procedure：



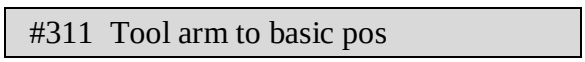
D. If the arm stops at the 180° position and the spindle is unclamped：

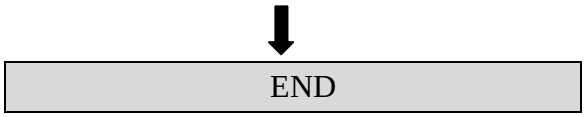
Procedure：



E. If the arm stops at 180° position or at the position behind 180 ° and the spindle is clamped：

Procedure：





Remark：

The function “#308 Tool pocket put in” would be executed or not by yourself.

(9) Press the [END] key to quit the “HELP function”.

(10) Enter the “pocket table” and check the spindle tool number (at the pocket 0) and the stand-by tool number whether correct or not, change the tool if it is not correct.

(11) Complete.

HELP function context：

****

!!! attention !!!
only for supervisor

X, Y, Z can be moved by
X+, X-, Y+, Y-, Z+, Z- key
or handwheel

service tool changer
(double arm cam driven type)

! manual mode active !
start function: key "NC start"

****

#301 S to toolchange position
#302 Z to toolchange position
#303 Y to toolchange position
#304 X to toolchange position
#307 Tool pocket put out
#309 Tool arm to unclamping pos
#305 Tool unclamping
#310 Tool arm to clamping pos
#306 Tool clamping
#311 Tool arm to basic pos
#308 Tool pocket put in
#312 Magazine turn cw (right)
#313 Magazine turn ccw (left)
#314 Magazine reference
#315 Delete spindle status (T0)

****

【ATC Troubleshooting for automatic tool change procedure is interrupted】

- **Alarm Reason 1** :

  The TNC didn't restart and the Z axis was at the tool changing position put in(down) or put out(up) :

Troubleshooting：

(1) Release the emergency stop.

(2) TNC power on.

(3) Close the guard door.

(4) Change to “manual operating mode”.

(5) Select the [MOD] key on the keyboard and press the soft key [HELP] to enter “HELP function”.

(6) Press the “CE” key to clear alarm messages.

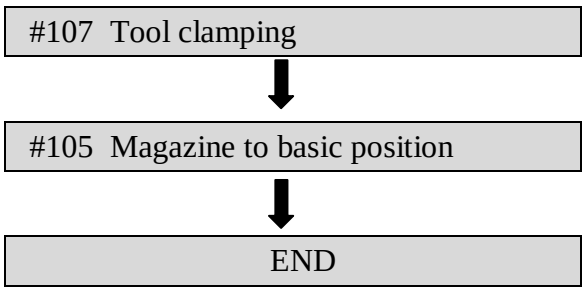
(7) Move the bar up or down, a message will display on the top of screen layout. Described below：

  (a) “99 Message in PLC window”： it means this function can’t be executed.

  (b) “Programming and editing”： it means this function can be executed with the [START] button.

  (c) “94 Function OK !”： it means this function has ready.

(8) Process following procedure：



(9) Press the [END] key to quit the “HELP function”.

(10) Enter the “pocket table” and check the spindle tool number (at the pocket 0) and the stand-by tool number whether correct or not, change the tool if it is not correct.

(11) Complete.

- **Alarm Reason 2** :

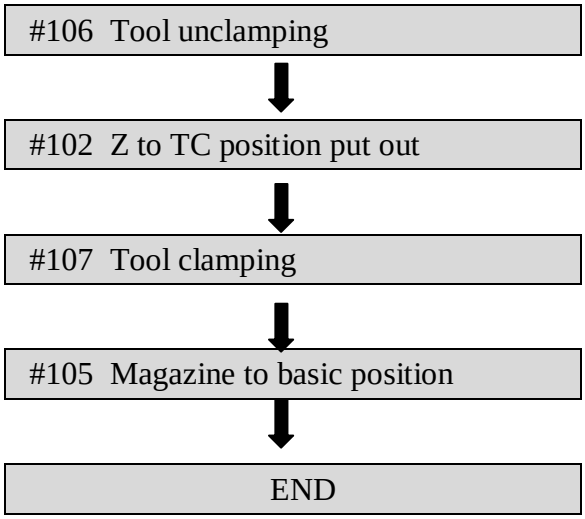
  Condition 1：The TNC didn't restart, but the Z axis was not at the tool changing position put in(down) or put out(up) :

  Condition 2：If Z axis is absolute and the TNC be restarted, the Z axis was not at the tool changing position put in(down) or put out(up) :

Troubleshooting：

(1) Release the emergency stop.

(2) TNC power on.
(3) Close the guard door.
(4) Change to “manual operating mode”.
(5) Select the [MOD] key on the keyboard and press the soft key [HELP] to enter “HELP function”.
(6) Press the “CE” key to clear alarm messages.
(7) Process following procedure：



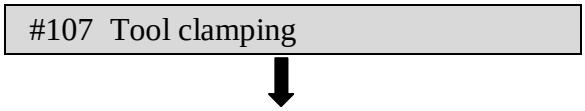
(8) Press the [END] key to quit the “HELP function”.
(9) Enter the “pocket table” and check the spindle tool number (at the pocket 0) and the stand-by tool number whether correct or not, change the tool if it is not correct.
(10) Complete.

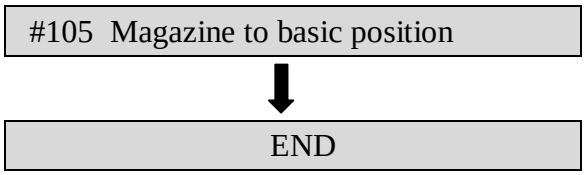
- **Alarm Reason 3** :

  If Z axis is not absolute and the TNC be restarted, the Z axis was not at the tool changing position put in(down) or put out(up) :

Troubleshooting：

(1) Take off the tool with hand from the magazine if the spindle head nearby tool.
(2) Release the emergency stop.
(3) TNC power on.
(4) Change to “manual operating mode”.
(5) Select the [MOD] key on the keyboard and press the soft key [HELP] to enter “HELP function”.
(6) Press the “CE” key to clear alarm messages.
(7) Close the guard door.
(8) Process following procedure：





(9) Enter the "pocket table" and check the spindle tool number (at the pocket 0) and the stand-by tool number whether correct or not, change the tool if it is not correct.

(10) Complete.

※ Attention：

(1) After ATC troubleshooting has done, if the spindle tool NO. shows '0' on the screen and a tool on the spindle head too, then you must take off this tool, because tool NO. "0" means no tool, otherwise, while doing ATC tool change this tool will drop, it could make the magazine or other equipments of machine damage.

(2) Before executing "#105 Magazine to basic position" function, make sure the spindle head has away from the magazine or the tool on the magazine has been taken off if the Z axis was not at the tool changing position, otherwise, the tool could drop.

HELP function context：

****

!!! ATTENTION !!!

only for supervisor

X, Y, Z can be moved by

X+, X-, Y+, Y-, Z+, Z- key

or handwheel

service tool changer

(single arm)

! manual mode active !

start function: key "NC start"

****

#101 S to TC position

#102 Z to TC position put out

#103 Z to TC position put in

#104 Magazine to spindle

#105 Magazine to basic position

#106 Tool unclamping

#107 Tool clamping

#108 Magazine turn cw

#109 Magazine turn ccw

#110 Magazine reference

#111 Delete spindle status (T0)