

## iAT2000 CNC Gateway

### Operation Manual Beta

# Table of Contents

<b>1. CNC Gateway Guide .....</b>	<b>3</b>
1.1.    Hardware.....	3
1.2.    CNC Support.....	3
1.3.    Software .....	5
1.3.1.    CNC Gateway Page: Home .....	5
1.3.2.    CNC Gateway Page: Info.....	5
1.3.3.    CNC Gateway Page: Servo Spindle and utilization .....	6
1.3.4.    CNC Gateway Page: Parameter .....	6
1.3.5.    CNC Gateway Page: Alarm .....	7
1.3.6.    CNC Gateway Page: NC File.....	7
1.3.7.    CNC Gateway Page: Setting.....	8
<b>2. SkyMars Launch &amp; Setup.....</b>	<b>9</b>
2.1.    Setup CNC Controller connections .....	9
2.2.    Launch “CNC Gateway Utility”:.....	11
<b>3. CNC Gateway SQL Function.....</b>	<b>12</b>
3.1.    SQL Database Information on CNC Gateway .....	12
3.2.    SQL Database Sheet .....	12
3.3.    SQL Fuction .....	15
3.3.1.    Write Command to [reload_table].....	15
3.3.2.    Example: Write Marco .....	16
3.3.3.    Program Action .....	18
3.4.    Error code Define .....	20
3.5.    Appendix : SQL Data Table .....	22
<b>4. Version.....</b>	<b>29</b>

# 1. CNC Gateway Guide

## Introduction

iAT2000 CNC Gateway provides a convenient interface to integrate major CNC controllers into NEXCOM I4.0 Solution Network. The NEXCOM developed software contains APIs to gather data from the non-open CNC systems, and then use SQL software to actively transfer data to Database. The Gateway is a once-for-all solution for all different CNC Controllers in the market, which greatly reduce the effort required for System Integrators to develop various connection interfaces by their own. With the crucial device, SI can focus more on monitoring and analysis development; eventually maximize the effectiveness of factory automation.

## Gateway Features

- Plug-and-play CNC gateway to integrate controllers to the industrial internet of machines
- Support one-click connection to mainstream CNC Controllers such as Fanuc, Mitsubishi, Heidenhain, Siemens
- Collect important machine information including position, coordinate offsets, alarm, etc.
- Connect to on-demand combination of controllers with one CNC gateway
- Transfer data to iAT2000 SCADA or MySQL/SQLite database
- Provide dashboard interface to monitor machine status
- Connecting max. 5 or 10 CNC controllers via TCP/IP.
  - iAT2000 CNC-5 Gateway
  - iAT2000 CNC-10 Gateway

### 1.1. Hardware

Hardware	OS	Windows 7 professional 64bit SP2↑
	RAM	4G
	Hard disk	SSD 64G
	CPU	Atom E3826 1.46HZ
	NISE 105	<a href="http://www.nexcom.com.tw/Products/industrial-computing-solutions/industrial-fanless-computer/atom-compact/fanless-computer-nise-105-e3845">http://www.nexcom.com.tw/Products/industrial-computing-solutions/industrial-fanless-computer/atom-compact/fanless-computer-nise-105-e3845</a>

### 1.2. CNC Support

	Fanuc	Mitsubishi	Heidenhain	Siemens-OPC UA
Features	Oi-B/ Oi-C/ Oi-D/ 16i/ 18i/ 21i/ 31i/ 32i	M70/ M700/ M80/ M800	iTNC530/ TNC640	828D/ 840D
CNC information	O	O	O	O
CNC status	O	O	O	O
Position	O	O	O	O

	Fanuc	Mitsubishi	Heidenhain	Siemens-OPC UA
Features	Oi-B/ Oi-C/ Oi-D/ 16i/ 18i/ 21i/ 31i/ 32i	M70/ M700/ M80/ M800	iTNC530/ TNC640	828D/ 840D
G Code	O	O	X	O
othercode	O	O	O	O
feed/ spindle	O	O	O	O
Time	O	P	P	O
PartCount	O	O	O	O
SET relative coordinates	O	X	X	X
SET system time	O	X	X	X
Current Alarm	O	O	O	O
Alarm history	O	O	O	O
Current Operation	O	X	X	X
Operation history	O	X	X	X
PLC alarm	O	X	X	X
Servo Current	O	X	X	X
Servo	O	O	O	O
Spindle	O	O	O	O
Temperature	O	X	O	O
Tool Offset	O	O	O	X
SET Tool offset value	O	O	O	X
Tool Pocket	X	X	O	O
SET Tool Pocket	X	X	O	X
WorkCoord	O	O	O	X
SET WorkCoord	O	O	O	X
Macro	O	O	X	X
SET Macro	O	O	X	X
Program operation_MEM	O	O	O	P
Program operation_FTP	O	O	X	X
SET NC main program	O	X	X	X
SET parameter	O	X	X	X
PLC	P	P	P	P

## 1.3. Software

### 1.3.1. CNC Gateway Page: Home

#### ◆ Machine List

CNC Type, IP, Port, Machine Name...

#### ◆ Set Machine & Data List

The screenshot shows the 'Home' tab of the iAT2000\_CNC\_Gateway software interface. At the top, there is a menu bar with icons for Home, Info, ServoSpindle, Parameter, Alarm, NCFile, Setting, and a help icon. Below the menu is a title bar 'iAT2000\_CNC\_Gateway'. The main area displays a table titled 'M70' listing connected CNC machines. The columns include CNCType, IP, Port, LinkStatus, MachineName, Mode, Status, Current Prog., PartCount, CycleTime, and BusyTime. The data shows four entries: FANUC 59.120.227.244 (IP), 8193 (Port), 0 (LinkStatus), fanuc0i (MachineName), --- (Mode), START (Status), O1237 (Current Prog.), 362 (PartCount), 21 : 30 : 17 (CycleTime), and 0.00H (BusyTime). The second entry is FANUC 59.120.227.238 (IP), 18193 (Port), 1 (LinkStatus), fanuc18i (MachineName), MEM (Mode), START (Status), 6002 (Current Prog.), 0 (PartCount), 21 : 28 : 4 (CycleTime), and 0.00H (BusyTime). The third and fourth entries are MITSUBISHI 59.120.227.242 (IP), 683 (Port), 1 (LinkStatus), M70 (MachineName), MEM (Mode), START (Status), 6002 (Current Prog.), 0 (PartCount), 21 : 28 : 4 (CycleTime), and 0.00H (BusyTime). The fourth entry is MITSUBISHI 59.120.227.243 (IP), 683 (Port), 1 (LinkStatus), M80 (MachineName), MEM (Mode), START (Status), 0001 (Current Prog.), 0 (PartCount), 7 : 42 : 21 (CycleTime), and 0.00H (BusyTime).

### 1.3.2. CNC Gateway Page: Info

#### ◆ Position, CNC status, G Code, Part Count...

#### ◆ Servo load, Servo speed, Spindle load, Spindle speed...

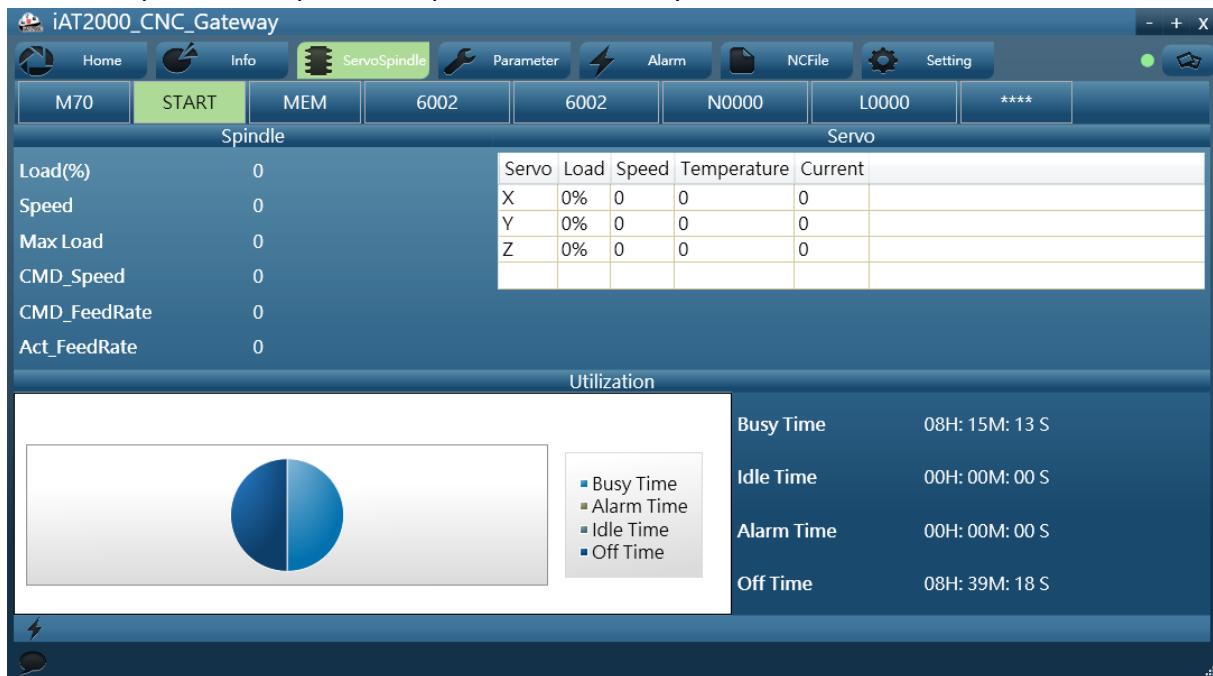
The screenshot shows the 'Info' tab of the iAT2000\_CNC\_Gateway software interface. At the top, there is a menu bar with icons for Home, Info, ServoSpindle, Parameter, Alarm, NCFile, Setting, and a help icon. Below the menu is a title bar 'iAT2000\_CNC\_Gateway'. The main area displays a table for the machine 'fanuc18i'. The table has columns for Address, Value, and Unit. The rows show current positions: X(mm) at -45.334, Y(mm) at 24.001, and Z(mm) at 11.500. It also shows machine parameters like O0097, O0098, N0019, L0002, and part counts. Below this is a detailed information section with tables for Feed, Speed, and PartCount, along with system status and error logs.

Address	Value	Unit
X(mm)	-45.334	
Y(mm)	24.001	
Z(mm)	11.500	
O0097		
O0098		
N0019		
L0002		
PartCount	119	

Information										O0097	L0002		
H:	0	F:	0	T:	1	G00	G17	G90	G22	G94	G21	G40	G92X0.Y0.Z0.
D:	0	S:	0	M:	8	G49	G80	G98	G50	G67	G97	G54	G91G00X-33.023Y47.94
B:	0	F%:	128	S%:	100	G64	G69	G15	G40.1	G25	G160	G13.1	F4000.
Feed	0	(mm/min)		Power	29168H	13M	0S						Z-95.
Speed	0	(RPM)		Cutting	9309H	52M	14S						Z-3.323
PartCount	119			Cycle	0H	4M	8S						G01Z-2.
				Operation	2511H	15M	24S						Z-2.54
				System	2018/12/22 10:19:30								Y-8.54
													v 20.277

### 1.3.3. CNC Gateway Page: Servo Spindle and utilization

- ◆ Servo and Spindle load, speed, Temperature...and Daily Utilization Record.



### 1.3.4. CNC Gateway Page: Parameter

- ◆ Tool Offset, WorkCoord, Marco

Offset	No	LENGTH GEOM	LENGTH WEAR	RADIUS GEOM	RADIUS WEAR
	1	12	1.5	0.5	0.6
	2	4	3	11	12
	3	4	3.3	3.33	3.334
	4	4	4.4	4.44	4.444
	5	10	8	7	6
Marco	6	0.006	0.06	0.004	0.05
WorkCoord	7	0	0	0	0
	8	0	0.05	0	0
	9	0	0	0	0
	10	10.5	1	2	5
	11	47.5	0.263	526	5
	12	10	0	0	0
	13	0	0	0	0
	14	0	0	0	0
	15	0	0	0	0
	16	0	0	8	0
	17	0	0	0	0

### 1.3.5. CNC Gateway Page: Alarm

- ◆ Alarm, Alarm History, Operation History

Date	Class	Error ID	Message
2018/09/26 16:02:55	3	78	NUMBER NOT FOUND
2018/09/26 16:12:14	2	78	NUMBER NOT FOUND
2018/09/26 16:15:11	3	78	NUMBER NOT FOUND
2018/09/26 16:48:25	0	78	NUMBER NOT FOUND
2018/09/26 16:48:45	12888	78	NUMBER NOT FOUND
2018/10/08 13:09:50	12888	100	PARAMETER WRITE ENABLE
2018/10/08 14:19:49	12888	78	NUMBER NOT FOUND
2018/10/12 13:55:32	12888	78	NUMBER NOT FOUND
2018/10/12 13:56:17	12888	78	NUMBER NOT FOUND
2018/10/17 13:24:33	12888	71	DATA NOT FOUND
2018/10/17 13:25:01	0	71	DATA NOT FOUND
2018/10/18 11:03:03	0	71	DATA NOT FOUND
2018/10/18 16:11:22	0	78	NUMBER NOT FOUND

### 1.3.6. CNC Gateway Page: NC File

- ◆ NC File list, Upload File, Active Program...

Name	Size	Date
新增資料夾		2018/12/12 下午 05:00
0004.txt	719 Bytes	2018/12/12 下午 03:59
新文字文件.txt	6 Bytes	2018/12/24 下午 05:00

Name	Size
0001	102 Bytes
0628	18 Bytes
6002	377 Bytes
6003	409 Bytes
6101	60 Bytes
6102	83 Bytes
6104	77 Bytes
6666	31 Bytes
7701	53 Bytes
61011	58 Bytes
0306308200REVA012.MPF	4.62 KB
987654321456789	0 Bytes
BOOT.VER	16 Bytes
CPUACCT.POWER	5 Bytes

G4X10.  
M0  
M30  
%

### 1.3.7. CNC Gateway Page: Setting

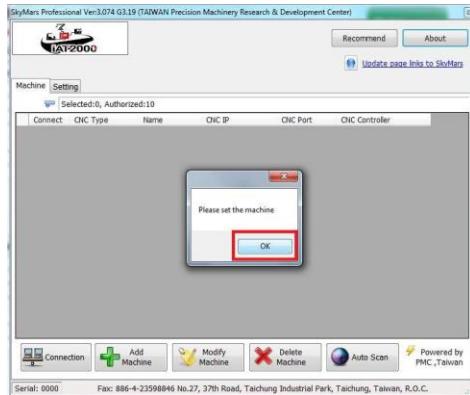
- ◆ Version, Language, Data Base Setting...



## 2. SkyMars Launch & Setup

### 2.1. Setup CNC Controller connections

Step 1: Please power/on CNC gateway and SkyMars Professional program with "Please set the machine" window will display automatically, Please click the "OK" button.



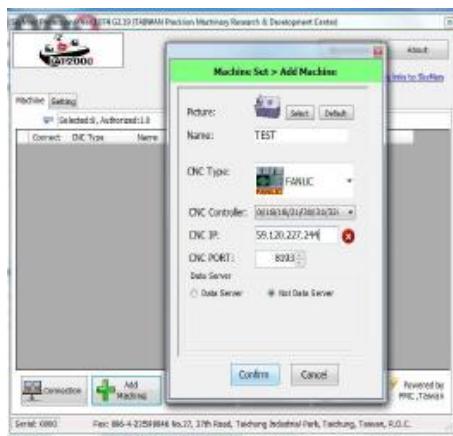
Step 2: Please click "Add Machine" button.



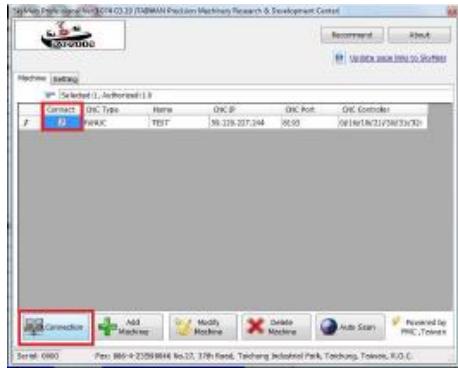
Step 3: Please enter "Name", choose "CNC Type", "CNC Controller", enter "CNC IP", CNC PORT" and check "Data Server" option.

Please click "Confirm" button once machine setting is completed.

Example set picture is as below;



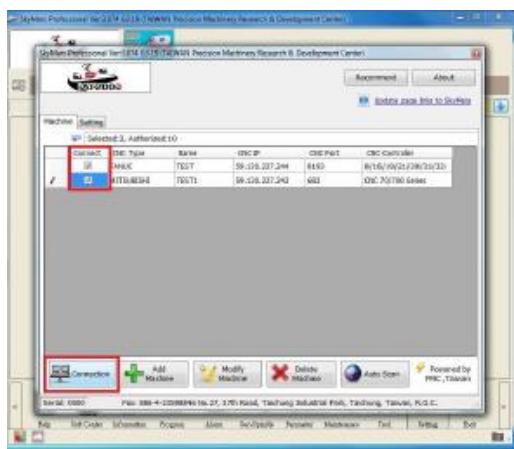
Step 4: Check the box in “Connect” column of the machine list and then click “Connection” button to begin connection.



Step 5: Once successfully connected, a machine icon will appear on the top to indicate that. To add more machines, click “Setting” button in the lower right.



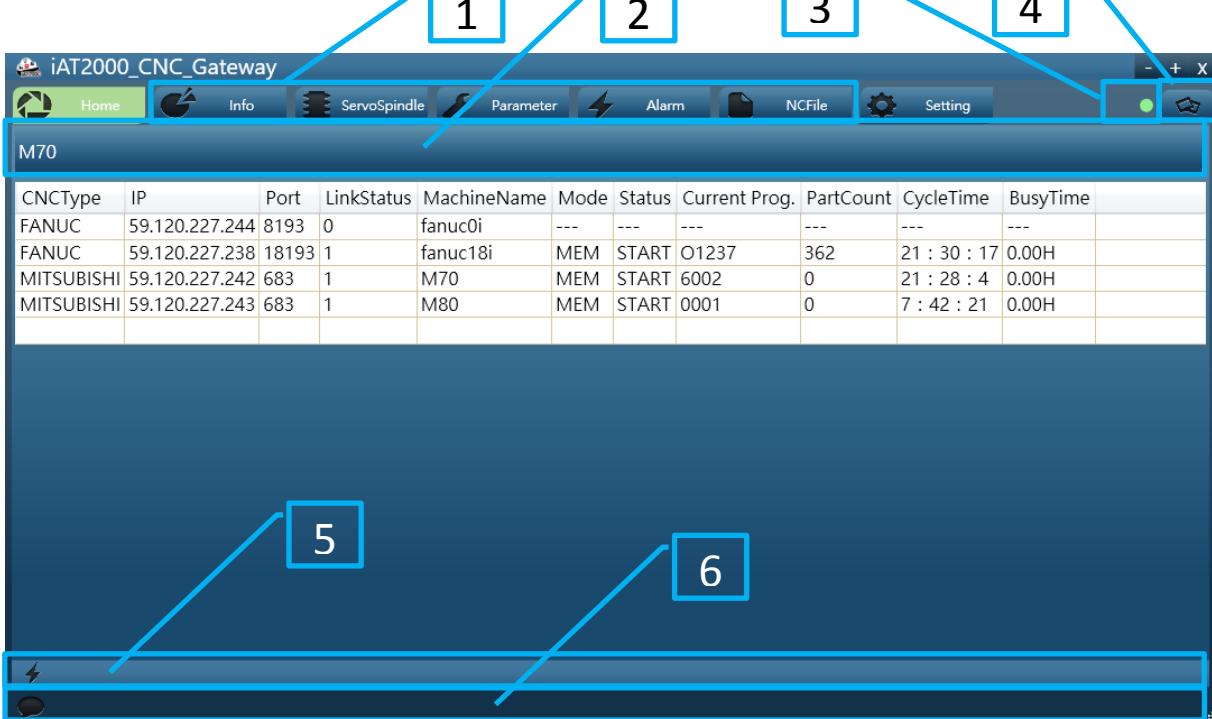
Step 6: Follow the same procedure to add more machines, check the “Connect” column, and then click “Connection” to connect. New machine will be added to the top of the window once successful.



Step 7: When setup is finished, minimize this window so the software will keep running in the background.



## 2.2. Launch “CNC Gateway Utility”:



No.	Description
1	Page button, to check the machine information.
2	The select machine name.
3	CNC Gateway Utility link to SkyMars status, red: miss connection, green: connect is successful.
4	Switch the select machine.
5	Machine alarm and hit message.
6	Operation message.

### 3. CNC Gateway SQL Function

#### 3.1. SQL Database Information on CNC Gateway

Host Name/IP	localhost
Port	3306
Database Name	iat2000_cnc_gateway
Username	root
Password	nexcomcnctgateway

#### 3.2. SQL Database Sheet

Sheet Name	Description	Page.
alm_current	Current alarm of all machines, data contains: message, code, class...	22
alm_current_heid	Current alarm of Heidenhain machine, if the machine's manufacturer is not Heidenhain, the table is empty.	27
cncgateway_errorlist	The CNCGateway error list.	22
cncgateway_loglist	The CNCGateway log list.	22
feed_spindle	Feed and spindle information of all machine, data contains: override feed, override spindle, actual feed, actual spindle.	22
gcode	Gcode of all machines.	22
information	Information of all machines, data contains: number of controlled axes, cnc type, and number of max axes...	22
information_heid	Information of Heidenhain machine, if the machine's manufacturer is not Heidenhain, the table is empty. [N]is machine index of list.	28
machineN_alm_history	Alarm history of machine, data contains: message, code, time. [N]is machine index of list.	22
machineN_alm_history_heid	Alarm history of Heidenhain machine, if the machine's manufacturer is not Heidenhain, the table is empty. [N]is machine index of list.	28
machineN_macro	Macro data list of machine, [N]is machine index of list.	23
machineN_msg_history	Operation history of Fanuc machine, data contains: message, time. [N]is machine index of list.	23
machineN_nc_ftp_list	Ftp program list of machine, data contains: name, time, size... [N]is machine index of list.	23
machineN_nc_mem_list	MEM program list of machine, data contains: name, time, size... [N]is machine index of list.	23
machineN_offset	Offset data of machine, [N]is machine index of list.	23
machineN_plc_alarm	Plc alarm of machine, [N]is machine index of list.	24

Sheet Name	Description	Page.
machineN_workcoord	WorkCoord data of machine, [N]is machine index of list.	24
machinelist	Machine list of all connections, data contains: CNCType, IP, Port, Link status, machine name, CNC status, current program, part count, cycle time, busy time.	24
msg_current	Current alarm of all machines, data contains: message, code, class...	24
othercode	H Code, D Code, T Code, M Code, B Code, F Code, S Code...	24
part_count	Part count of all machines.	25
part_required	Part required of all machine, only FANUC has this item.	25
part_total	Part total of all machines, only FANUC has this item.	25
position	Position of all machines, data contains: unit, machine, absolute, relative, distance coordinates. Heidenhain hasn't relative position.	25
prog_action	Fill the machine name, program name, action code... to this table with the database command can modified program by this table. More information at 0 Program Action.	25
reload_table	Fill the machine name, action string or table name and you can use action to update all information.	25
servo_current	Servo currents of all machines, only FANUC has this item.	26
servo_load	Servo load of all machines.	26
servo_speed	Servo speed of all machines.	26
servo_temperature	Servo temperature of all machines.	26
spindle_load	Spindle load of all machine.	26
spindle_speed	Spindle speed of all machines.	26
spindle_temperature	Spindle temperature of all machines.	26
status	Status of all machine, data contains: main and current program., current line, mode, status, alarm	26
time	Power time, cutting time, cycle time and operation time of all machines. The format is [hour, min, sec].Mitsubishi hasn't cutting time.	27
time_cnc	Machine system time of all machines. The format is [hour, min, sec]. Heidenhain hasn't this item.	27
time_heid	Machine running, machine up, nc up and spindle running time of Heidenhain machine.	28

Sheet Name	Description	Page.
utilization_today	Busy, idle, alarm, off total time and part total of all machines on today.	27
write_marco	Fill the machine name; marco number and value to this table with the database command can modify marco by this table.	27
write_workcoord	Fill the machine name; workcoord coordname and value to this table with the database command can modify workcoord by this table.	27
write_offset	Fill the machine name, offset number and value to this table with the database command can modified offset by this table.	27

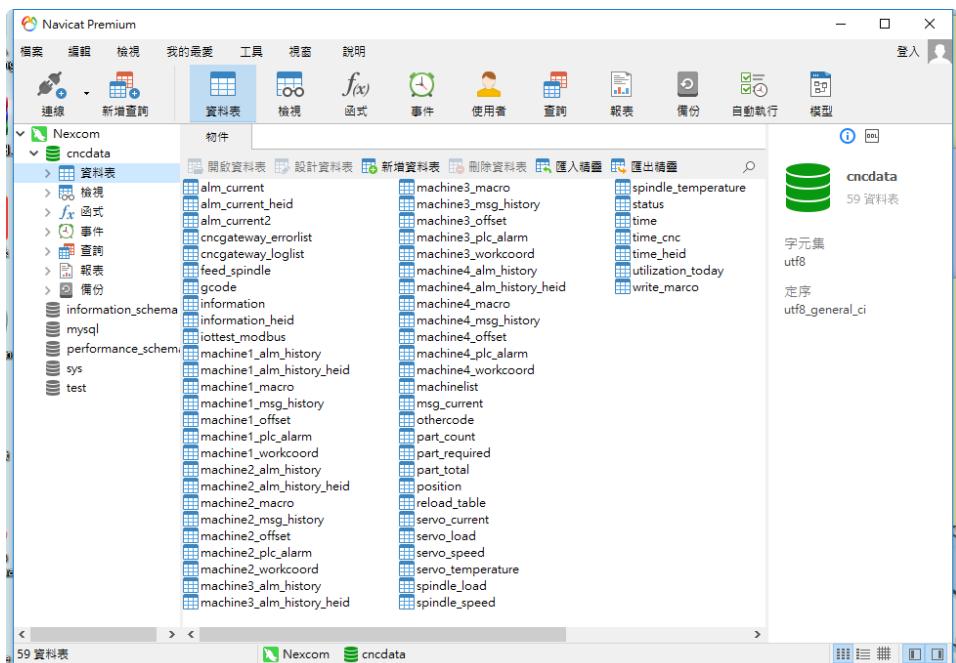
### 3.3. SQL Function

#### 3.3.1. Write Command to [reload\_table]

MachineName	TableName	Description
“all” / MachineName	read_marco	[MachineName] is “all”, update all machine marco of list. [MachineName] is one machine of list will update the machine marco.
“all” / MachineName	read_workcoord	As above
“all” / MachineName	read_offset	As above
“all” / MachineName	read_almhistory	As above
“all” / MachineName	read_msghistory	As above
“all” / MachineName	read_ncmemList	As above
“all” / MachineName	read_ncftpList	As above
“all” / MachineName	read_all_cycle	Set all data auto to update in cycle time.
“all” / MachineName	read_all_once	Set all data auto to update once time.
“all” / MachineName	close_all_cycle	Set all data close cycle update.
MachineName	write_marco	Update the marco of [write_marco] that MahineName Column is same with MachineName.
MachineName	write_offset	Update the offset of [write_offset] that MahineName Column is same with MachineName.
MachineName	write_workcoord	Update the workcoord of write_workcoord] that MahineName Column is same with MachineName.
MachineName	prog_action	According the command of [prog_action] table, to upload/ download/ delete the CNC program and set CNC main program. More information at 0 Program Action.

### 3.3.2. Example: Write Macro

3.3.2.1. In Program start step, it will automatically create the table [write\_macro], [cncgateway\_errorlist] to database.



3.3.2.2. Write the DeviceName, Number, and Value to [write\_macro].

物件	write_macro @cnodata (Nex...		
	開始交易	文字	篩選
	排序	匯入	匯出
MachineName	Number	Value	
fanuc0i	500	500	
fanuc18i	506	506	
fanuc18i	507	507	
fanuc18i	508	508	

3.3.2.3. Write the MachineName, TableName andTimeStamp to [reload\_table], it will activate the updated action. (The TimeStamp can't be null, or you can input space key to TimeStamp instead )  
iAT2000\_CNCGateway will update based on [write\_marco] .

物件	reload_table @cnodata (Nex...		
	開始交易	文字	篩選
	排序	匯入	匯出
MachineName	TableName	TimeStamp	
fanuc18i	write_marco		
all	read_marco	2018/12/19 下午 05:47:20	
fanuc18i	read_offset	2018/12/19 下午 05:55:20	

iAT2000\_CNC\_Gateway

The screenshot shows the software interface for the iAT2000 CNC Gateway. The top menu bar includes Home, Info, ServoSpindle, Parameter (highlighted in green), Alarm, NCFile, Setting, and a Help icon. Below the menu is a toolbar with icons for Home, Info, ServoSpindle, Parameter, Alarm, NCFile, Setting, and Help. The main area displays a table with two columns of headers: 'Offset' and 'Macro'. The 'Offset' column contains values 172 through 562. The 'Macro' column contains values 173 through 563. Each row has two columns under 'Value'.

	No.	Value	No.	Value	No.	Value	No.	Value
Offset	172	0	173	0	174	0	175	0
Macro	177	0	178	0	179	0	180	0
	182	0	183	0	184	0	185	0
	187	0	188	0	189	0	190	0
	192	0	193	0	194	0	195	0
	197	0	198	0	199	0	500	0
	502	0	503	10	504	0	505	0
	507	507	508	508	509	509	510	1
	512	0	513	0	514	0	515	0
	517	5170	518	5180	519	519	520	0
	522	0	523	0	524	0	525	0
	527	0	528	0	529	0	530	0
	532	0	533	0	534	0	535	0
	537	0	538	0	539	0	540	0
	542	0	543	0	544	0	545	0
	547	0	548	5	549	0	550	0
	552	0	553	0	554	0	555	0
	557	0	558	0	559	0	560	52
	562	0	563	0	564	0	565	0

3.3.2.4. If you got an error at writing, you can find the error message in [cncgateway\_errorlist].

cncgateway\_errorlist @test (cnc\_test1) - 資料表

The screenshot shows a database table named 'cncgateway\_errorlist' with two columns: 'TimeStamp' and 'Message'. The table lists several entries of errors related to failed writes to device 'fanc0i'. The most recent entry is highlighted in blue.

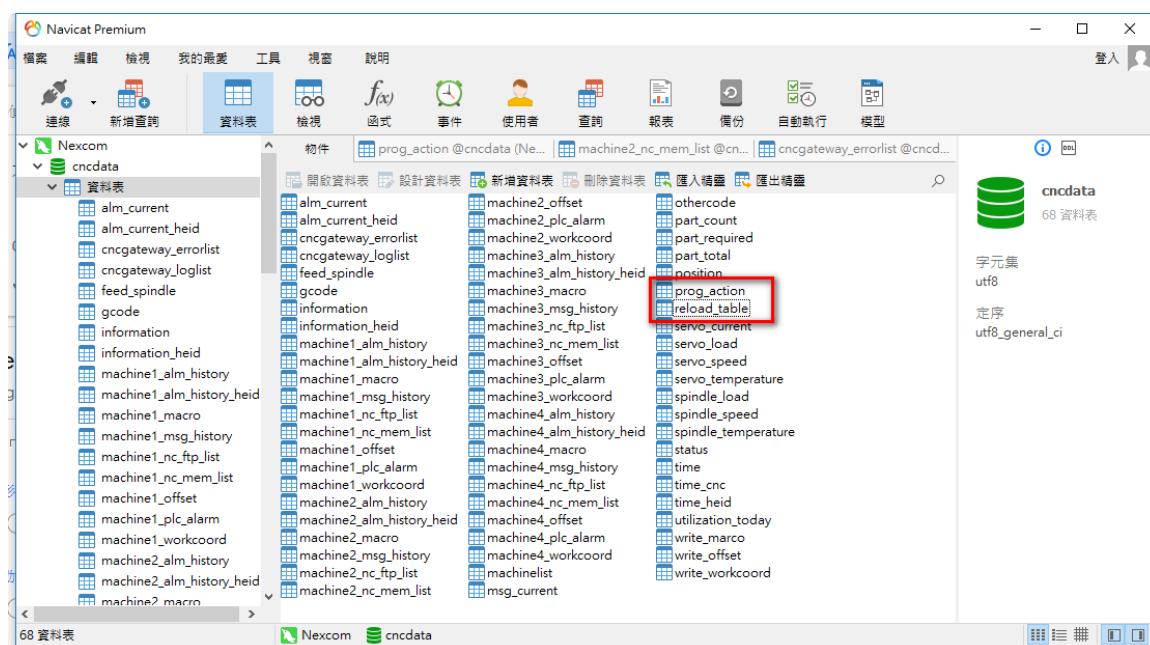
TimeStamp	Message
10/08/2018 09:4	[Write Macro Failed]DeviceName=fanc0i Number = 1 MacroData = 10 ret=7
10/08/2018 09:4	[Write Macro Failed]DeviceName=fanc0i Number = 5 MacroData = 55 ret=7
10/08/2018 09:4	[Write Macro Failed]DeviceName=fanc0i Number = 9 MacroData = 99 ret=7
10/08/2018 10:1	[Write Macro Failed]DeviceName=fanc0i Number = 1 MacroData = 11 ret=7
10/08/2018 10:1	[Write Macro Failed]DeviceName=fanc0i Number = 6 MacroData = 66 ret=7
10/08/2018 10:1	[Write Macro Failed]DeviceName=fanc0i Number = 77 MacroData = 77 ret=7
10/08/2018 03:4	[Write Macro Failed]DeviceName=fanc0i Number = 508 MacroData = 508 ret=-16
10/08/2018 03:4	[Write Macro Failed]DeviceName=fanc0i Number = 508 MacroData = 508 ret=-16

### 3.3.3. Program Action

Column	Description
MachineName	The activate machine's name
NcName	CNC program name.
ProgComman	Program command code. 1: download from CNC MEM, 2:upload to CNC MEM, 3:delete from CNC MEM, 4: download from CNC FTP, 5:upload to CNC FTP, 6:delete from CNC FTP, 7:upload to CNC MDI, 8:set CNC main program
ProgParh	If program command is downloading, [ProgParh] is CNC file download folder path; [NcName] is CNC's program name. If program command is uploading, [ProgParh] is upload file folder path; [NcName] is upload file name.

### 3.3.4. Example: Download CNC MEM program

#### 3.3.4.1. Check the table [reload\_table], [prog\_action] is existing.



#### 3.3.4.2. Write the machine name, NC name, command code and program path to [prog\_action].

The [progrpath] means download file path on local disk.

物件	prog_action @cnadata (Ne...)	machine2_nc_mem_list (			
開始交易	文字	篩選	排序	匯入	匯出
	MachineName	NcName	ProgComman	ProgPath	
	M70	O0003		1 D:\	
▶	M70	O0008		1 D:\	
	M70	O9999		3 D:\	

3.3.4.3. Write the MachineName, TableName andTimeStamp to [reload\_table], it will activate the Program action. (TheTimeStamp can't be null, or you can input space key toTimeStamp instead )  
iAT2000\_CNCGateway will update based on [prog\_action].

MachineName	TableName	TimeStamp
M70	prog_action	
M70	read_ncmemList	

3.3.4.4. If you got an error at writing, you can find the error message in [cncgateway\_errorlist].

TimeStamp	Message
2018-12-26 03:31:13	[S]Error msg from M80_GET_nc_ftp_list: 1
2018-12-26 03:31:42	[S]Error msg from fanuc18i_GET_time_cnc: -1
2018-12-26 03:31:29	[S]Error msg from M70_GET_nc_ftp_list: 1
2018-12-26 03:31:55	<b>[ProgAction Failed]MachineName=M70, NcName = O0008, ProgCommand = 1, ret=1</b>
2018-12-26 03:39:05	[S]Error msg from M70_GET_othercode: 1
2018-12-26 03:39:06	[S]Error msg from M70_GET_feed_spindle: 1
2018-12-26 03:39:06	[S]Error msg from M70_GET_spindle_load: 1
2018-12-26 03:39:06	[S]Error msg from M70_GET_spindle_speed: 1
2018-12-26 03:39:07	[S]Error msg from fanuc18i_GET_plc_alarm: -6
2018-12-26 03:39:10	[S]Error msg from fanuc18i_GET_spindle_load: 6
2018-12-26 03:39:12	[S]Error msg from fanuc18i_GET_nc_ftp_list: 14
2018-12-26 03:39:23	[S]Error msg from fanuc18i_GET_time_cnc: -1
2018-12-26 03:39:28	[S]Error msg from M80_GET_nc_ftp_list: 1
2018-12-26 03:39:51	[S]Error msg from fanuc18i_GET_plc_alarm: -6
2018-12-26 03:39:52	[S]Error msg from fanuc18i_GET_spindle_load: 6
2018-12-26 03:39:53	[S]Error msg from M70_GET_othercode: 1
2018-12-26 03:39:53	[S]Error msg from M70_GET_feed_spindle: 1

### 3.4. Error code Define

Error code	Error class	Description
-31	Camera Exception	Camera has an internal exception error.
-30	Camera Current Running	Camera is currently connected and image capture.
-29	Camera Disconnect	Camera is not connected.
-28	RS-232 Close	The RS-232 Com Port is turned off.
-27	RS-232 Over limit	The RS-232 connection module has exceeded the upper limit.
-26	RS-232 Return Type	Please specify the type returned by RS-232.
-25	RS-232 Open Failed	The RS-232 COM Port has failed to be turned on or has been turned on.
-24	RS-232 Exception	RS-232 exception. Please use the corresponding function to get the error.
-23	Sensor Exception	Sensor module or API has error. Please use the corresponding function to get the error.
-22	Sensor Current Running	The sensor is currently being executed.
-21	USB key error	USB Key failure (hardware lock failure).
-20	Plug-In Time out	The function executed has Timeout. If you want to lengthen it, please modify Register directly.
-19	SkyMars Busy	SkyMars is currently being launched.
-18	Not supported	The controller does not support this function.
-17	Protocol error (Ethernet version only)	The network card settings are incorrect.
-16	Socket error (Ethernet version only)	The connection failed or the controller refused to connect.
-15	DLL file error	The CNC model does not correspond to the DLL or the DLL file has been lost.
-8	Handle number error	Please get the handle value.
-7	Version mismatch between the CNC/PMC and library	The CNC/PMC version cannot be used for the library. Please replace the library or update the CNC/PMC control software.
-6	Abnormal library state	An exception error occurred in the library.
-3	Random key timeout	The random key expires. Please retry the Random key.
-2	Reset or stop request	The Reset or Stop button is pressed. The function was aborted.

Error code	Error class	Description
-1	CNC Busy	The CNC is busy, please try again later.
0	Normal termination	Normal state, no error occurred.
1	Error(function is not executed, or not available)	Please execute a specific function before you use it.
2	Error(data block length error, error of number of data)	Check the information on the number and length information.
3	Error(data number error)	Please check the data number is correct.
4	Error(data attribute error)	Please check the property information is correct.
5	Error(data error)	Written incorrectly.
6	Error(no option)	CNC not purchase this function.
7	Error(write protection)	Write protection.
8	Error(memory overflow)	Memory overflows.
9	Error(CNC parameter error)	The parameter setting is incorrect.
10	Error(buffer empty/full)	The buffer is empty or full.
11	Error(path number error)	The path is incorrect.
12	Error(CNC mode error)	The CNC Mode is incorrect.
13	Error(CNC execution rejection)	The CNC refused to execute.
14	Error(Data server error)	An error occurred in the Data Server.
15	Error(alarm)	An error occurred in alert handling.
16	Error(stop)	The CNC status is at stop or emergency.
17	Error(State of data protection)	The information is protected by the CNC.
18	Error(Not found Machine ID)	The machine can't connect.
19	Error(No out)	Please confirm NO.
20	Error>Password)	Wrong password.
21	Error(Compatible)	Compatibility issues. (Unable to match the old API).
-999	Error (Disconnect)	There is no connection with SkyMars.
-995	Error (Function miss match)	There is no matching function when the program is running.
-990	Error	Undefined error.
-901	Error (no definition)	No defined the data when running the function.
-902	Error (write file)	An error occurred while writing file.
-903	Error (read file)	An error occurred while reading file.

### 3.5. Appendix : SQL Data Table

Tables	Field	Type	Key	Description
alm_current	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	IsAlarm	tinyint(1)		Alarm status
	AlmClassArray	varchar(255)		Alarm class of all alarms, use [,] to split.
	AlmCodeArray	varchar(255)		Alarm code of all alarms, use [,] to split.
	AlmMsgArray	mediumtext		Alarm message of all alarms, use [,] to split.
cncgateway_errorlist	TimeStamp	datetime		Time of record
	Message	text		Message of gateway error
cncgateway_loglist	TimeStamp	datetime		Time of record
	Message	text		Message of gateway log
feed_spindle	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	ActFeed	double		Actual federate
	ActSpindle	int(11)		Actual spindle RPM
	OvFeed	double		FeedRate override
	OvSpindle	double		Spindle override
gcode	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	GdataArray	varchar(20000)		Gcode list, use [,] to split.
information	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	Axes	int(11)		Enabled count of axes
	AxisNameArray	varchar(255)		Enabled no. of axes, use [,] to split.
	CncType	varchar(45)		Product number of CNC
	MaxAxes	int(11)		Count of max Axes
	Nc_Ver	varchar(45)		NC versions
	Series	varchar(45)		Type of CNC, ex: milling, turning...
machineN_alm_history	MachineName	varchar(45)		Name of the machine
	TimeStamp	datetime	PRI	Time of record
	AlmClass	varchar(45)		Alarms class
	AlmCode	varchar(45)		Alarms code
	AlmDate	varchar(255)		Alarms date time
	AlmMsg	varchar(255)		Alarms Message

Tables	Field	Type	Key	Description
machineN_macro	MachineName	varchar(45)		Name of the machine
	TimeStamp	datetime		Time of record
	Number	int(11)	PRI	Macro number
	Value	double		Macro value
machineN_msg_history	MachineName	varchar(45)		Name of the machine
	TimeStamp	datetime		Time of record
	MsgCode	smallint(6)		Operations code
	MsgDate	varchar(255)		Operations date time
	MsgText	varchar(255)		Operations message
machineN_nc_ftp_list	MachineName	varchar(45)		Name of the machine
	TimeStamp	datetime		Time of record
	NcName	varchar(45)	PRI	Name of FTP programs
	Size	int(11)		Size (byte) of FTP programs
	DateTime	varchar(255)		Date time of FTP programs
	FD	varchar(45)		Data type, file or directory
machineN_nc_mem_list	MachineName	varchar(45)		Name of the machine
	TimeStamp	datetime		Time of record
	NcName	varchar(45)	PRI	Name of memory programs
	Size	int(11)		Size (byte) of memory programs
	DateTime	varchar(255)		Date time of memory programs, it's depend on the brand.
	Remark	varchar(45)		Remark of memory programs, it's depend on the brand.
	FD	varchar(45)		Data type, file or directory
machineN_offset	MachineName	varchar(45)		Name of the machine
	TimeStamp	datetime		Time of record
	ColumnCount	tinyint(4)		Count of Offset type
	ColumnName	varchar(255)		Name of Offset type, use [,] to split.
	Number	int(11)	PRI	Offset number
	Column1~10	double		The contents of Column1~10 are in order of [ColumnName]. Ex: ColumnName= [LENGTH GEOM, LENGTH WEAR, RADIUS GEOM, RADIUS WEAR], so Column1= LENGTH GEOM, Column2= LENGTH WEAR, Column3= RADIUS GEOM, Column4:=RADIUS WEAR

Tables	Field	Type	Key	Description
machineN_plc_alarm	MachineName	varchar(45)		Name of the machine
	TimeStamp	datetime		Time of record
	AlmMsg	varchar(255)		description of plc alarm
machineN_workcoord	MachineName	varchar(45)		Name of the machine
	TimeStamp	datetime		Time of record
	ColumnCount	tinyint(4)		Count of Offset type
	ColumnName	varchar(255)		Name of workcoord type, use [,] to split.
	CoordName	varchar(45)	PRI	Workcoord name
	Column1~10	double		The contents of Column1~10 are in order of [ColumnName]. Ex: ColumnName= [X,Y,Z], so Column1= X, Column2= Y, Column3= Z.
machinelist	TimeStamp	datetime		Time of record
	Manufacturer	varchar(45)		Manufacturer of machine
	IP	varchar(45)		IP of machine
	Port	varchar(45)		IP port of machine
	LinkStatus	int(11)		Line status of machine
	MachineName	varchar(45)	PRI	Name of the machine
	Mode	varchar(45)		CNC mode of machine
	Status	varchar(45)		CNC status of machine
	CurProg	varchar(45)		Current program of machine
	PartCount	varchar(45)		Part count of machine
	CycleTime	varchar(150)		Cycle time of machine
	BusyTime	varchar(150)		Busy time of machine
msg_current	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	IsMsg	tinyint(1)		Status of current operation message
	MsgCode	smallint(6)		Code of current operation
	MsgText	varchar(255)		Context of current operation
othercode	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	BCode	int(11)		BCode. It's depending on Mitsubishi.
	DCode	int(11)		DCode. Heidenhain hasn't this item.
	FCode	int(11)		FCode

Tables	Field	Type	Key	Description
	HCode	int(11)		HCode. Heidenhain hasn't this item.
	MCode	int(11)		MCode
	SCode	int(11)		SCode
	TCode	int(11)		TCode
part_count	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	PartCount	int(11)		Part count of machine
part_required	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	PartRequired	int(11)		Part required of machine
part_total	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	PartTotal	int(11)		Part total of machine
position	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	AbsArray	varchar(255)		Absolute coordinates list, use [,] to split. The contexts are in order of [AxisNameArray].
	AxisNameArray	varchar(255)		Enabled no. of axes, use [,] to split.
	DecPoint	int(11)		Coordinate decimal point
	DistArray	varchar(255)		Remaining distance coordinates list, use [,] to split. The contexts are in order of [AxisNameArray].
	MachArray	varchar(255)		Mechanical coordinate list, use [,] to split. The contexts are in order of [AxisNameArray].
	RelArray	varchar(255)		Relative coordinate list, use [,] to split. The contexts are in order of [AxisNameArray].
prog_action	MachineName	varchar(100)		Name of the machine
	NcName	varchar(100)	PRI	Name of program that will be operated
	ProgComman	int(11)		Command Number.
	ProgPath	text		The local path of the program to be uploaded or downloaded
reload_table	MachineName	varchar(45)	PRI	Name of the machine
	TableName	text		Table name or command
	TimeStamp	text		Action Time of record

Tables	Field	Type	Key	Description
servo_current	MachineName	varchar(45)		Name of the machine
	TimeStamp	datetime		Time of record
	AxisCurrentArray	varchar(255)		Servo current list, use [ , ] to split. The contexts are in order of [AxisNameArray].
servo_load	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	ServoLoadPerce ntArray	varchar(255)		Servo load list, use [ , ] to split. The contexts are in order of [AxisNameArray].
servo_speed	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	ServoSpdArray	varchar(255)		Servo speed list, use [ , ] to split. The contexts are in order of [AxisNameArray].
servo_temperature	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	AxisTempArray	varchar(255)		Servo temperature list, use [ , ] to split. The contexts are in order of [AxisNameArray]. It's depending on Fanuc.
spindle_load	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	SpLoad	double		Spindle load.
spindle_speed	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	SpSpeed	int(11)		Spindle speed
spindle_temperature	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	Spindle_1_Temp	double		First spindle temperature
	Spindle_2_Temp	double		Second spindle temperature
status	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	Alarm	varchar(45)		Alarm status, [Alarm]or [****]
	CurProg	varchar(45)		Current program
	CurSeq	int(11)		Current sequence N line no.
	Emg	varchar(45)		Emergency stop, [EMG]or [****]
	MainProg	varchar(45)		Main program
	Mode	varchar(45)		CNC mode of machine
	Status	varchar(45)		CNC status of machine

Tables	Field	Type	Key	Description
time	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	CuttingArray	varchar(255)		Cutting time of machine, format is [HH,mm,ss]
	CycleArray	varchar(255)		Cycle time of machine, format is [HH,mm,ss]
	OperationArray	varchar(255)		Operation time of machine, format is [HH,mm,ss]
	PowerArray	varchar(255)		Power time of machine, format is [HH,mm,ss]
time_cnc	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	SystemTimeArray	varchar(255)		Operation time of machine, format is [yyyy,mm,dd,HH,mm,ss]
utilization_today	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	AlarmTotal	double		Total alarm time today
	BusyTotal	double		Total running time today
	CycleTotal	int(11)		Total number of cycles today
	IdleTotal	double		Total idle time today
	OffTotal	double		Total power on time today
	PartTotal	int(11)		Total number of parts today
write_marco	MachineName	varchar(45)		Name of the machine
	Number	int(11)		Number of setting marco
	Value	double		Value of setting marco
write_offset	MachineName	varchar(45)		Name of the machine
	Number	int(11)		Number of setting offset
	ColumnCount	tinyint(4)		Count of setting offset value
	C1~10	double		C1~10 are in order of offset [ColumnName].
write_workcoord	MachineName	varchar(45)		Name of the machine
	Number	varchar(255)		Number of setting workcoord
	ColumnCount	tinyint(4)		Count of setting workcoord value
	Axis1~8	double		Axis1~8 are in order of offset [ColumnName].
alm_current_heid	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	IsAlarm	tinyint(1)		Alarm status
	ErrNumberArray	varchar(45)		Alarm number of all alarms, use [,] to split.

Tables	Field	Type	Key	Description
information_heid	ErrGroupArray	varchar(255)		Alarm group of all alarms, use [,] to split.
	ErrClassArray	varchar(255)		Alarm class of all alarms, use [,] to split.
	ErrMsgArray	mediumtext		Alarm message of all alarms, use [,] to split.
	ErrDescriptionArray	mediumtext		Alarm description of all alarms, use [,] to split.
machineN_alm_history_heid	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	Axes	int(11)		Enabled count of axes
	AxisNameArray	varchar(255)		Enabled no. of axes, use [,] to split.
	FCL	varchar(45)		
	Model	varchar(45)		
	Nc_Ver	varchar(45)		NC versions
	Plc_Ver	varchar(45)		PLC versions
time_heid	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record
	MachineRunningArray	varchar(255)		Cumulative machining time since installation.
	MachineUpArray	varchar(255)		Cumulative time that the machine has been on (no emergency stop) since installation.
	NcUpArray	varchar(255)		Cumulative time that the NC has been turned on since installation of the machine.
	SpindleRunningArray	varchar(255)		cumulative time of spindle has been running (M3 or M4)

## 4. Version

item	description	Update date	Guide Ver.	CNCGateway Ver.
<b>01</b>	First edition	2019/1/2	Ver.1.0	1.0.1