NexAIoT Co., Ltd.

iAT2000 System
IoT Automation Solutions
CNC Gateway
SMB200 Series
User Manual

www.nexaiot.com

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PREFACE

Copyright

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Acknowledgements

The SMB200 series is a trademark of NexAIoT Co., Ltd. All other product names mentioned herein are registered trademarks of their respective owners.

Regulatory Compliance Statements

This section provides the FCC compliance statement for Class A devices and describes how to keep the system CE compliant.

Declaration of Conformity

FCC

This equipment has been tested and verified to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.

CE

The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

RoHS Compliance

NexAIoT RoHS Environmental Policy and Status Update

NexAIoT is a global citizen for building the digital infrastructure. We are committed to providing green products and services, which are compliant with European Union RoHS (Restriction on Use of Hazardous Substance in Electronic Equipment) directive 2011/65/EU, to be your trusted green partner and to protect our environment.

RoHS restricts the use of Lead (Pb) < 0.1% or 1,000ppm, Mercury (Hg) < 0.1% or 1,000ppm, Cadmium (Cd) < 0.01% or 100ppm, Hexavalent Chromium (Cr6+) < 0.1% or 1,000ppm, Polybrominated biphenyls (PBB) < 0.1% or 1,000ppm, and Polybrominated diphenyl Ethers (PBDE) < 0.1% or 1,000ppm.

In order to meet the RoHS compliant directives, NexAIoT has established an engineering and manufacturing task force to implement the introduction of green products. The task force will ensure that we follow the standard NexAIoT development procedure and that all the new RoHS components and new manufacturing processes maintain the highest industry quality levels for which NexAIoT are renowned.

The model selection criteria will be based on market demand. Vendors and suppliers will ensure that all designed components will be RoHS compliant.

How to recognize NexAIoT RoHS Products?

For existing products where there are non-RoHS and RoHS versions, the suffix "(LF)" will be added to the compliant product name.

All new product models launched after January 2013 will be RoHS compliant. They will use the usual NexAIoT naming convention.

Warranty and RMA

NexAIoT Warranty Period

NexAIoT manufactures products that are new or equivalent to new in accordance with industry standard. NexAIoT warrants that products will be free from defect in material and workmanship for 2 years, beginning on the date of invoice by NexAIoT.

NexAIoT Return Merchandise Authorization (RMA)

- Customers shall enclose the "NexAIoT RMA Service Form" with the returned packages.

- Customers must collect all the information about the problems encountered and note anything abnormal or, print out any on-screen messages, and describe the problems on the "NexAIoT RMA Service Form" for the RMA number apply process.

- Customers can send back the faulty products with or without accessories (manuals, cable, etc.) and any components from the card, such as CPU and RAM. If the components were suspected as part of the problems, please note clearly which components are included. Otherwise, NexAIoT is not responsible for the devices/parts.

- Customers are responsible for the safe packaging of defective products, making sure it is durable enough to be resistant against further damage and deterioration during transportation. In case of damages occurred during transportation, the repair is treated as "Out of Warranty."

- Any products returned by NexAIoT to other locations besides the customers' site will bear an extra charge and will be billed to the customer.

Repair Service Charges for Out-of-Warranty Products

NexAIoT will charge for out-of-warranty products in two categories, one is basic diagnostic fee and another is component (product) fee.

System Level

- Component fee: NexAIoT will only charge for main components such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistor, capacitor.

- Items will be replaced with NexAIoT products if the original one cannot be repaired. Ex: motherboard, power supply, etc.

- Replace with 3rd party products if needed.

- If RMA goods can not be repaired, NexAIoT will return it to the customer without any charge.

Board Level

- Component fee: NexAIoT will only charge for main components, such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistors, capacitors.

- If RMA goods can not be repaired, NexAIoT will return it to the customer without any charge.

Warnings

Read and adhere to all warnings, cautions, and notices in this guide and the documentation supplied with the chassis, power supply, and accessory modules. If the instructions for the chassis and power supply are inconsistent with these instructions or the instructions for accessory modules, contact the supplier to find out how you can ensure that your computer meets safety and regulatory requirements.

Cautions

Electrostatic discharge (ESD) can damage system components. Do the described procedures only at an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

Safety Information

Before installing and using the device, note the following precautions:

▪ Read all instructions carefully.

▪ Do not place the unit on an unstable surface, cart, or stand.

▪ Follow all warnings and cautions in this manual.

▪ When replacing parts, ensure that your service technician uses parts specified by the manufacturer.

▪ Avoid using the system near water, in direct sunlight, or near a heating device.

▪ The load of the system unit does not solely rely for support from the rackmounts located on the sides. Firm support from the bottom is highly necessary in order to provide balance stability.

▪ The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Installation Recommendations

Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.

Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:

▪ A Philips screwdriver

▪ A flat-tipped screwdriver

▪ A grounding strap

▪ An anti-static pad

Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nose pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.

Safety Precautions

1. Read these safety instructions carefully.

2. Keep this User Manual for later reference.

3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.

4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.

5. Keep this equipment away from humidity.

6. Put this equipment on a stable surface during installation. Dropping it or letting it fall may cause damage.

7. The openings on the enclosure are for air convection to protect the equipment from overheating. DO NOT COVER THE OPENINGS.

8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.

9. Place the power cord in a way so that people will not step on it. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.

10. All cautions and warnings on the equipment should be noted.

11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.

12. Never pour any liquid into an opening. This may cause fire or electrical shock.

13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.

14. If one of the following situations arises, get the equipment checked by service personnel:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment does not work well, or you cannot get it to work according to the user's manual.
    e. The equipment has been dropped and damaged.
    f. The equipment has obvious signs of breakage.

15. Do not place heavy objects on the equipment.

16. The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace your obsolete outlet.

17. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

18. This product is intended to be supplied by a Listed Power Adapter, suitable for use at Tma 55 degree C whose output meets SELV and rating is 24Vdc, 2.5A min.

Technical Support and Assistance

1. For the most updated information of NexAIoT products, visit NexAIoT's website at www.nexaiot.com.

2. For technical issues that require contacting our technical support team or sales representative, please have the following information ready before calling:
   – Product name and serial number
   – Detailed information of the peripheral devices
   – Detailed information of the installed software (operating system, version, application software, etc.)
   – A complete description of the problem
   – The exact wordings of the error messages

Warning!
1. Handling the unit: carry the unit with both hands and handle it with care.

2. Maintenance: to keep the unit clean, use only approved cleaning products or clean with a dry cloth.

3. CompactFlash: Turn off the unit's power before inserting or removing a CompactFlash storage card.

Conventions Used in this Manual

Warning:
Information about certain situations, which if not observed, can cause personal injury. This will prevent injury to yourself when performing a task.

Caution:
Information to avoid damaging components or losing data.

Note:
Provides additional information to complete a task easily.

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CHAPTER 1: PRODUCT INTRODUCTION

Overview

Key Features

- Plug-and-play CNC gateway connects controllers to the industrial internet of machines

- One click to establish connection with mainstream CNC controllers such as Fanuc, Mitsubishi, Heindenhain, Siemens

- Collect important machine information including position, coordinate offsets, alarm etc.

- Up to 10 CNC controller can be connected via TCP/IP

- Transfer data to iAT2000 SCADA or MySQL/SQLite database

- Provide dashboard interface to monitor machine status

Software Specifications

Controller Connectivity

- A universal gateway to connect to several controllers
- Fanuc: 0i-B/0i-C/0i-D/16i/18i/21i/30i/31i/32i
- Mitsubishi: M70/M700/M80/M800
- HEIDENHAIN: iTNC530/iTNC640
- Siemens: 828D/840D

CNC Data Collection

- NC file
  - Support NC file transfer to and from CNC controller
  - Verify the part under production matches MES
  - Record the production history of connected machines
- Controller status
  - Allow plant managers to have full awareness of all machine status
  - Record the complete status of all time for analysis
- Uptime analysis
  - Display uptime and graphical result to improve plant efficiency
- Alarm & history
  - Trace alarm history of each machine for review and optimization
- Servo spindle load
  - Monitor the reasonable working load to avoid exxcess temperature on machines, and elongate machine lifespan
- Maintenance management
  - Couple with CNC controller's self-detection function to predict maintenance schedule and prevent unexpected downtime

Internal MySQL Interface

- Data Management
  - Collected data is stored in CNC gateway as a database in MySQL
  - The buffer database is available for SCADA, main database, and other applications to retrieve

Cloud Service

- Cloud service compatible with an additional IoT gateway

Hardware Specifications

Communication Protocols

▪ CNC protocol
▪ MySQL form datbase

System Configuration

▪ Intel® Celeron® J1900 2.42GHz, 4C4T,10W
▪ 4GB DDR3L system memory
▪ 128GB SATA3 SSD storage
▪ Windows 7 Pro 64-bit

I/O Interface

▪ 1 x SIM card holder
▪ 2 x 2 GbE Lan ports
▪ 3 x USB 2.0 (500mA per each), 1 x USB 3.0 (900mA)
▪ 2 x RS232/422/485* (COM1 support 2.5KV isolation protection)
▪ 1 x DVI-I, DisplayPort
▪ 2 x Antenna holes for optional Wi-Fi/4G antenna
▪ 1 x Optional mini-PCIe Wi-Fi/4G for wireless connectivity

Certification

▪ CE
▪ FCC Class A

Power & Dimension

▪ Power input: 1 x 3-pin DC input, support +24V DC input
▪ System dimension (W x D x H): 85 x 157 x 214 mm

Ordering Information
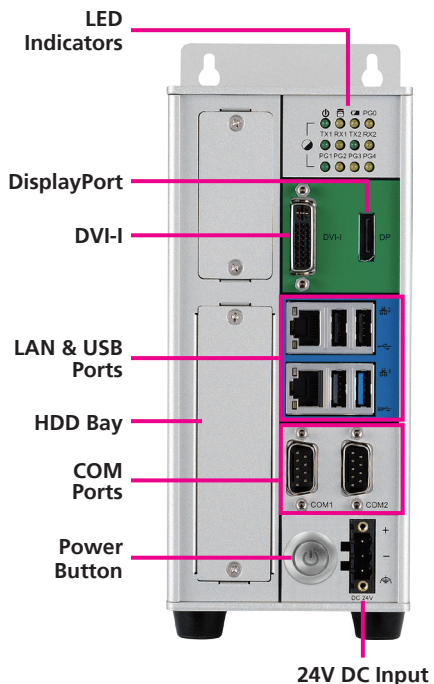
SMB200 (P/N: 10J7052CNC4XR)

Connect to 5 CNC, 4GB RAM, 2.5" 128GB SSD, Windows 7 Pro SP1 for Embedded Label Microsoft: 42C-00039

SMB210 (P/N: 10J7102CNC4XR)

Connect to 10 CNC, 4GB RAM, 2.5" 128GB SSD, Windows 7 Pro SP1 for Embedded Label Microsoft: 42C-00039

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SMB200 Series User Manual

Knowing Your CNC Gateway

Front View

LED Indicators

DisplayPort

DVI-I

LAN & USB Ports

HDD Bay

COM Ports

Power Button

24V DC Input

LED Indicators

Indicates the power, hard drive, battery, COM1/2 and GPO activity of the system.

DVI-I

Used to connect a digital LCD panel.

DisplayPort

Used to connect the system with display devices.

LAN Ports

Two LAN ports used to connect the system to a local area network.

USB Ports

USB 2.0 and USB 3.0 ports to connect the system with USB devices.

HDD Bay

A hard drive bay used to install 2.5" HDDs.

COM1 and COM2

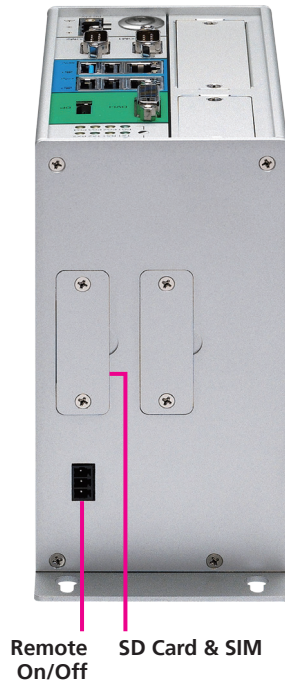Two DB9 ports used to connect RS232/422/485 compatible devices.

Power Button

Press to power-on or power-off the system.

24V DC Input

Used to plug a DC power cord.

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SMB200 Series User Manual

Top View

Remote On/Off Switch

Used to connect a remote to power on/off the system.

SD Card Slot

Used to insert a SD card.

SIM Slot

Used to insert a SIM card.
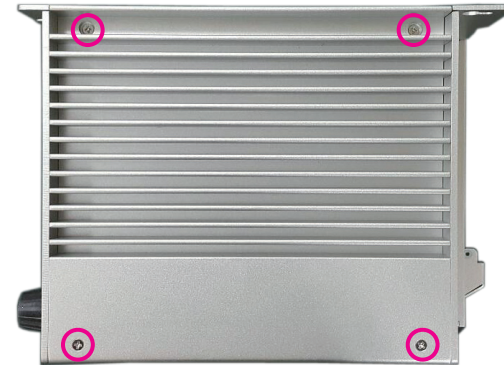
Remote On/Off   **SD Card & SIM**

Mechanical Dimensions
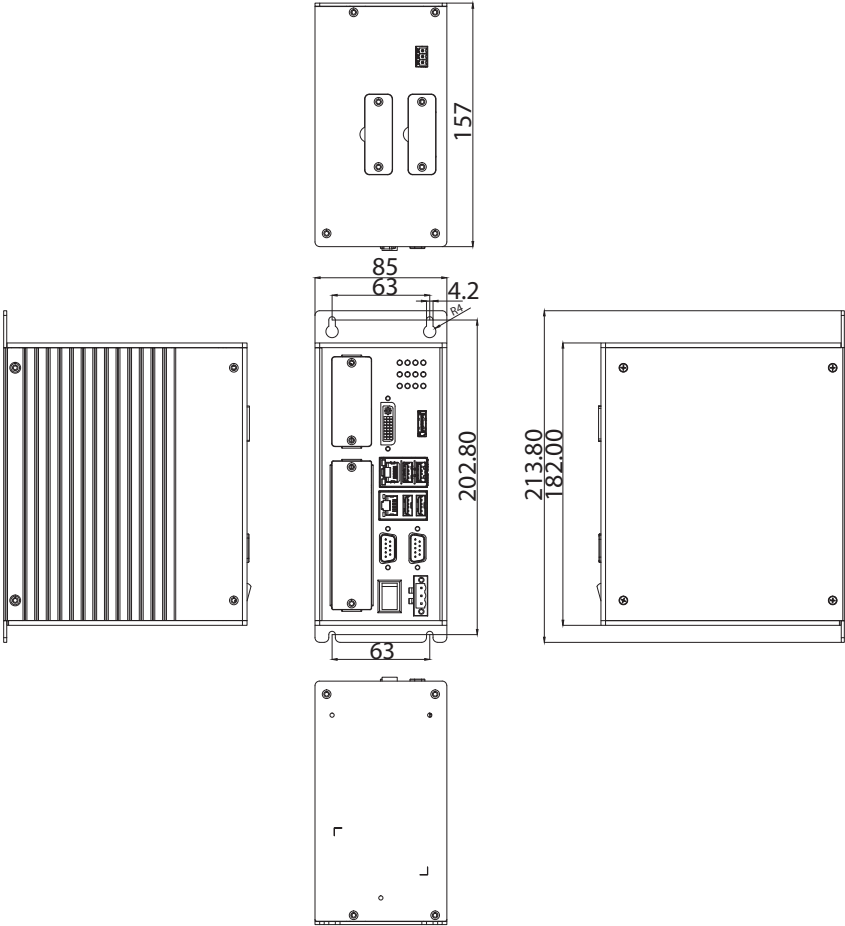
Chapter 2: System Setup
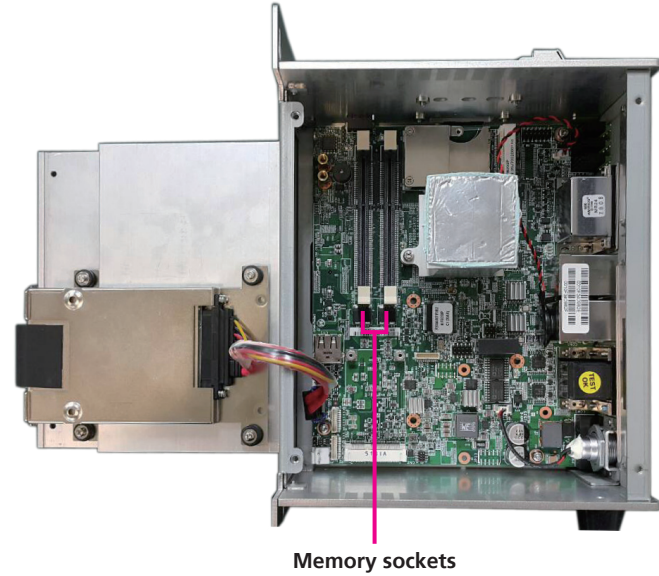
Installing a SO-DIMM Memory Module

1. Place the system on a flat surface to prepare for installation.

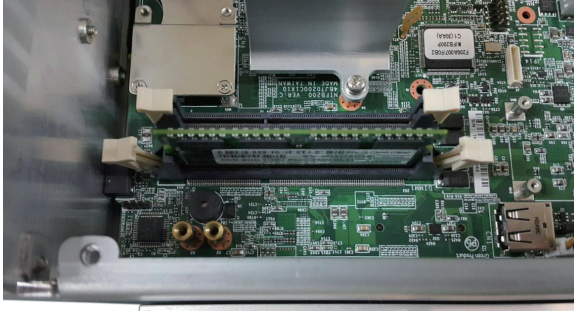2. Locate the four screws on the side of the chassis.

3. Remove the four screws and gently lift up the side cover.

4. Locate the memory module sockets.

Memory sockets
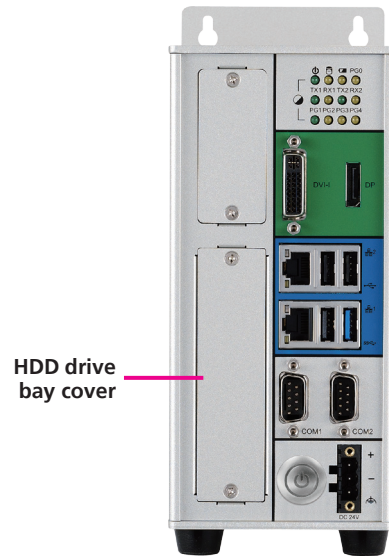
5. Insert the memory module into the socket.

6. Ensure the memory module is secured properly into the socket.

Installing a 2.5" SATA HDD

1. Locate the HDD drive bay cover on the front panel.

2. Remove the screws on the HDD drive bay cover.
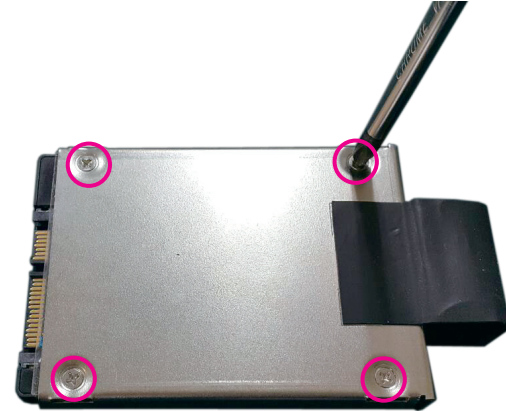
HDD drive bay cover

3. Pull out the HDD bracket by pulling the tape.

4. Install the 2.5" HDD into the bracket and secure it with screws.

5. Place the HDD bracket back to its original location.

6. Secure the HDD drive bay cover with screws.

Installing a Mini-PCIe Module (Half-Size)

1. Locate the mini-PCIe slot on the board.
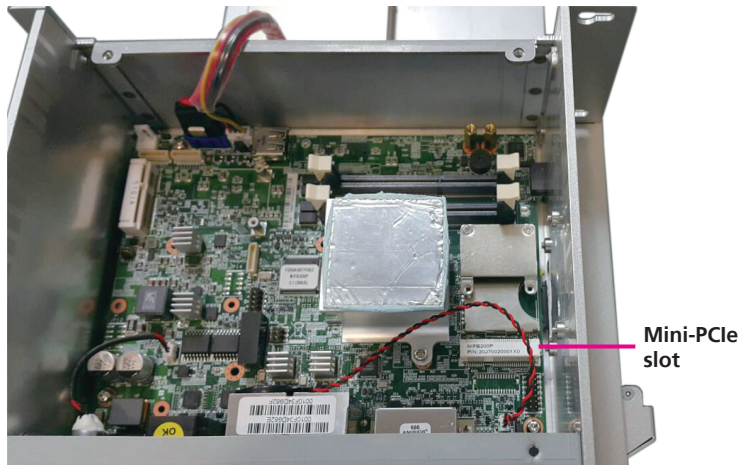
Mini-PCIe slot

2. Remove the mini-PCIe bracket from the board.
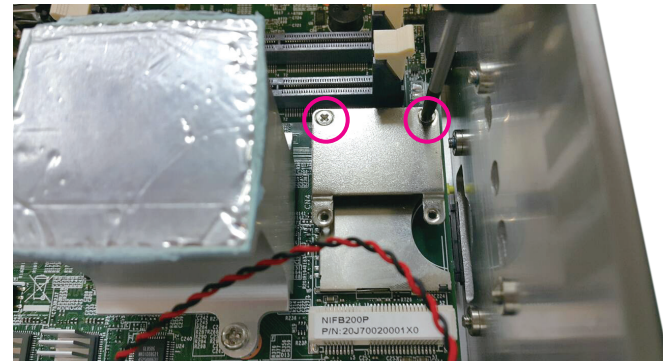
3. Screw the mini-PCIe bracket to the mini-PCIe module.

4. Insert the mini-PCIe module into the mini-PCIe slot at a 45 degree angle until the gold-plated connector on the edge of the module completely disappears into the slot.
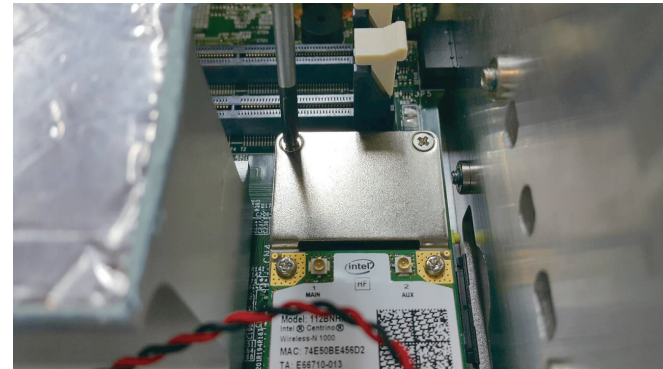
5. Push the module down and secure it with screws.

Installing a Mini-PCIe Module (Full-Size)

1. Locate the mini-PCIe slot on the board and remove the mini-PCIe bracket.

Mini-PCIe slot
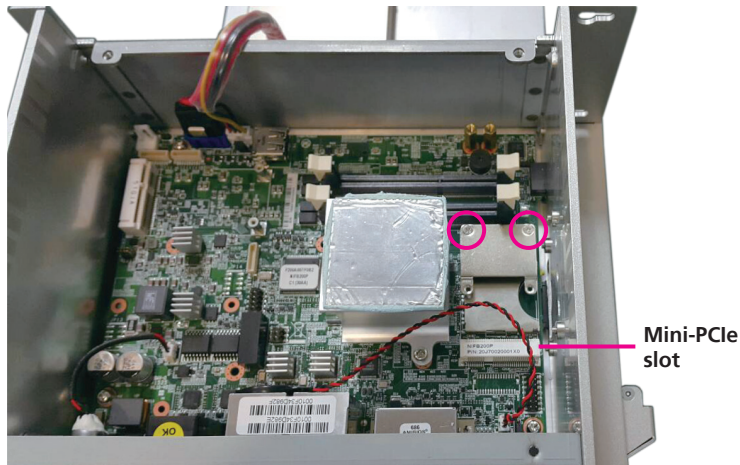
2-1. Insert the mini-PCIe module into the mini-PCIe slot at a 45 degree angle until the gold-plated connector on the edge of the module completely disappears into the slot.

2-2. Secure the module with screws.
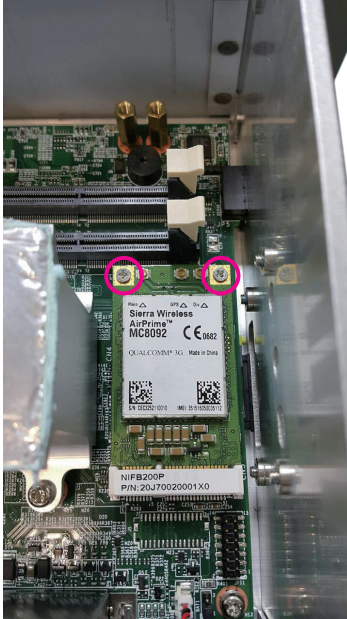
Installing a SD Card or SIM Card

SD Card Installation Instructions

1. Locate the SIM/SD card cover on the top of the system and loosen the screws on the cover.

2. Remove the cover.

SIM/SD card cover
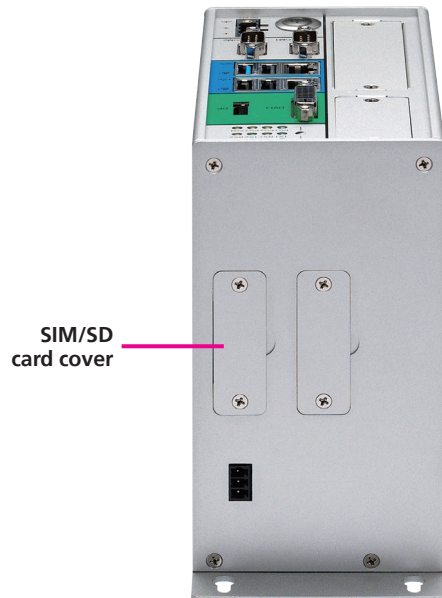
3. Insert the SD card into the SD card socket.

4. Ensure the SD card is correctly secured in position.

5. Press down the SD card until it is fixed into the socket.

SIM Card Installation Instructions

6. Locate the SIM card socket on the top of the system and press the yellow button gently to retrieve the SIM card holder.

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SMB200 Series User Manual
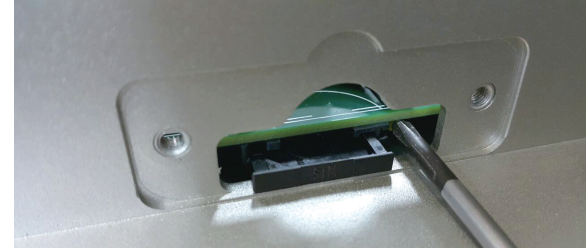
7. Place the SIM card into the holder.

8. Insert the SIM card holder back to its original position.
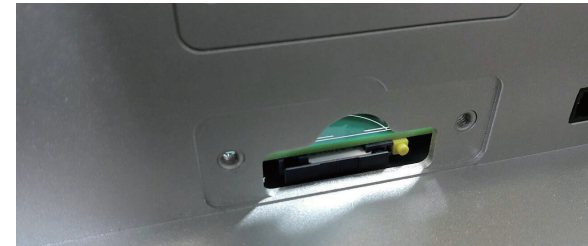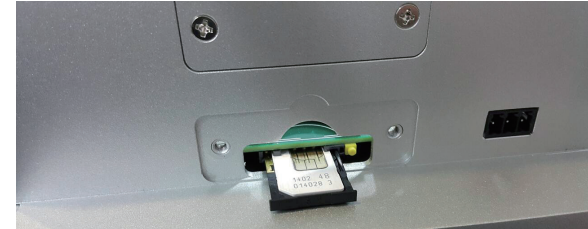
Installing an Antenna or Audio Cable

Antenna Installation Instructions

1. Remove the side cover of the chassis first.

2. Remove the antenna hole cover located on the top of the system. (2x Antenna Holes, 1x Audio Cable Hole)

Audio cable hole
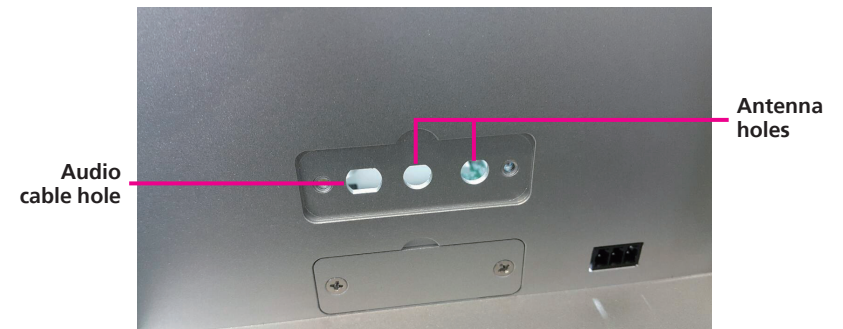
Antenna holes

3. Seperate the 2 rings (ring 1 and ring 2) from the antenna jack.

Ring 2   **Ring 1**

4. Insert the antenna jack through the antenna hole, and then install ring 1 and ring 2 onto the antenna jack.

5. Attach the antenna cable end onto the 3G or Wi-Fi mini-PCIe module.

Audio Cable Installation Instructions

6. Seperate ring 3 from the audio cable.
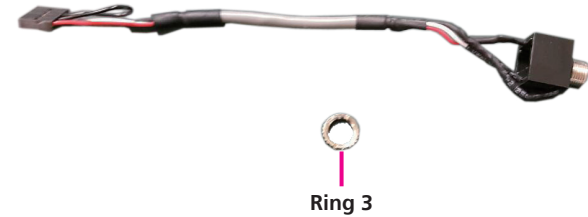
Ring 3

7. Insert the audio cable through the audio cable hole, and then install ring 3 onto the audio jack.

8. Attach the audio cable end to the JP4 connector, which is the audio pin header for the system.
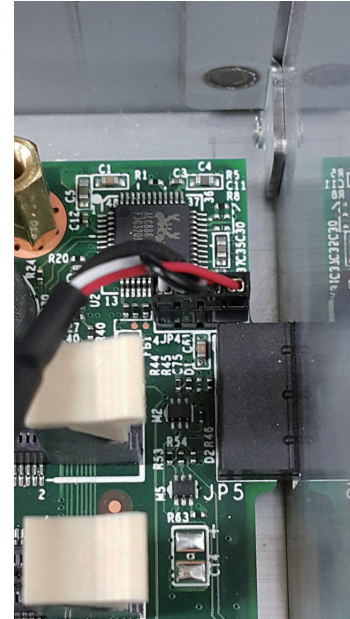
Chapter 3: CNC Gateway Guide

3. CNC Gateway 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 uses SQL software to actively transfer data to the database. This gateway is a one-fits-all solution for all different types of CNC controllers in the market, greatly reducing the effort required for system integrators to develop various connection interfaces on their own. For crucial devices, system integrators can focus more development effort on monitoring and analytics, maximizing the effectiveness of factory automation.

Gateway Features

- Plug-and-play CNC gateway designed to integrate controllers to the industrial internet of machines.
- Support one-click connection to mainstream CNC controllers such as Fanuc, Mitsubishi, Heidenhain and 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.
- Connect up to a maximum of 5 or 10 CNC controllers via TCP/IP.
  - iAT2000 CNC-5 Gateway
  - iAT2000 CNC-10 Gateway

3.1 CNC Support

✓: Support P: Partial Function Support ×: Not Supported

	Fanuc	Mitsubishi	Heidenhain	Siemens-OPC UA
Features	0i-B/0i-C/0i-D/ 16i/18i/21i/ 30i/31i/32i	M70/M700/ M80/M800	iTNC530/ TNC640	828D/840D
CNC Information	✓	✓	✓	✓
CNC Status	✓	✓	✓	✓
Position	✓	✓	✓	✓
G Code	✓	✓	×	✓
othercode	✓	✓	✓	✓
feed/spindle	✓	✓	✓	✓
Time	✓	P	P	✓
PartCount	✓	✓	✓	✓
Current Alarm	✓	✓	✓	✓
Alarm History	✓	✓	✓	✓
Current Operation	✓	×	×	×
Operation History	✓	×	×	×
PLC Alarm	✓	×	×	×

✓: Support P: Partial Function Support ×: Not Supported

	Fanuc	Mitsubishi	Heidenhain	Siemens-OPC UA
Features	0i-B/0i-C/0i-D/ 16i/18i/21i/ 30i/31i/32i	M70/M700/ M80/M800	iTNC530/ TNC640	828D/840D
Servo Current	✓	×	×	×
Servo	✓	✓	✓	✓
Spindle	✓	✓	✓	✓
Temperature	✓	×	✓	✓
Tool Offset	✓	✓	✓	×
SET Tool Offset Value	✓	✓	✓	×
Tool Pocket	×	×	✓	✓
SET Tool Pocket	×	×	✓	×
WorkCoord	✓	✓	✓	×
SET WorkCoord	✓	✓	✓	×
Macro	✓	✓	×	×
SET Macro	✓	✓	×	×
Program operation_MEM	✓	✓	✓	P
Program operation_FTP	✓	✓	×	×
SET NC main program	✓	×	×	×

3.2 Software

3.2.1 CNC Gateway Page: Home

- Machine List
  CNC Type (Manufacturer), IP, Port, LinkStatus, MachineName, etc.
- Set Machine & Data List

3.2.2 CNC Gateway Page: Info

- Position, CNC status, G Code, Part Count, etc.
- Servo load, Servo speed, Spindle load, Spindle speed, etc.

3.2.3 CNC Gateway Page: ServoSpindle and Utilization

- Servo and Spindle load, Speed, Temperature, etc.
- Daily Utilization Record
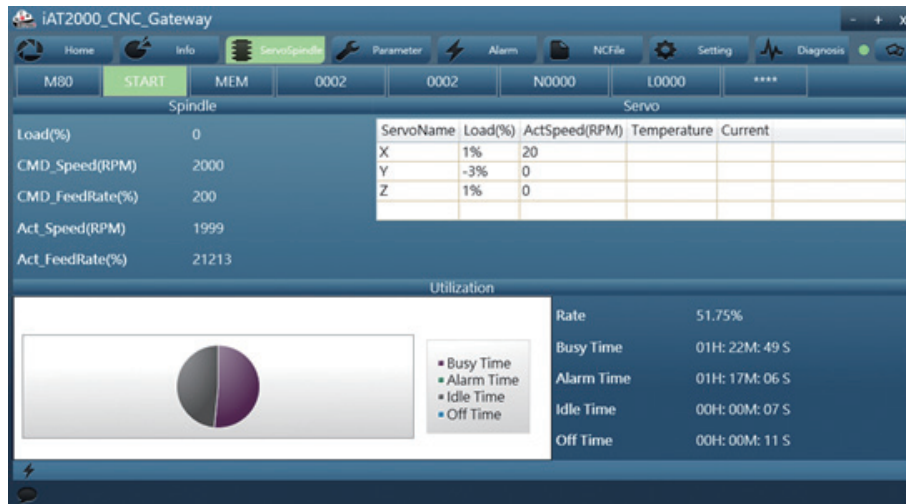
3.2.4 CNC Gateway Page: Parameter

- Tool Offset, WorkCoord, Macro and Pocket.

3.2.5 CNC Gateway Page: Alarm

▪ CurrentAlarm, AlarmRecord and Operation Record.

3.2.6 CNC Gateway Page: NCFile

- NC File list, Upload File, Active Program, etc.
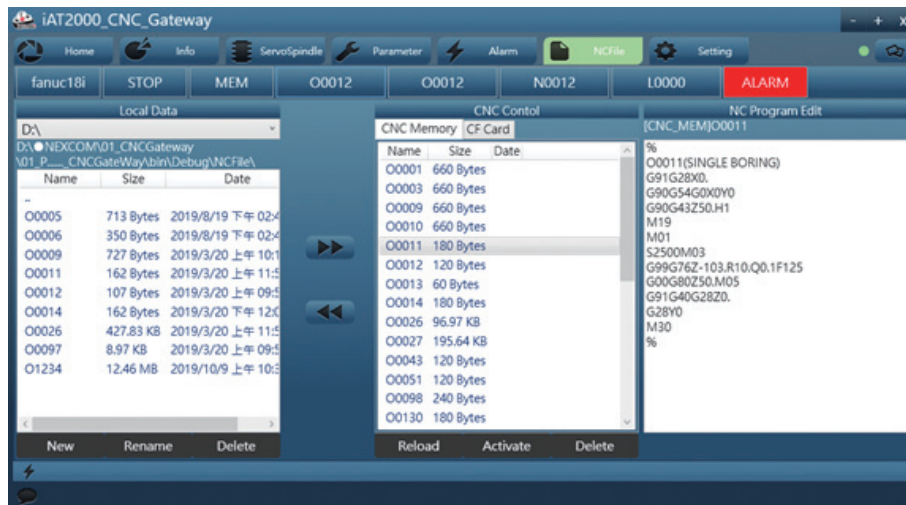
3.2.7 CNC Gateway Page: Setting

- Version, Language, Database Settings, etc.

3.3 Launch CNC Gateway Utility
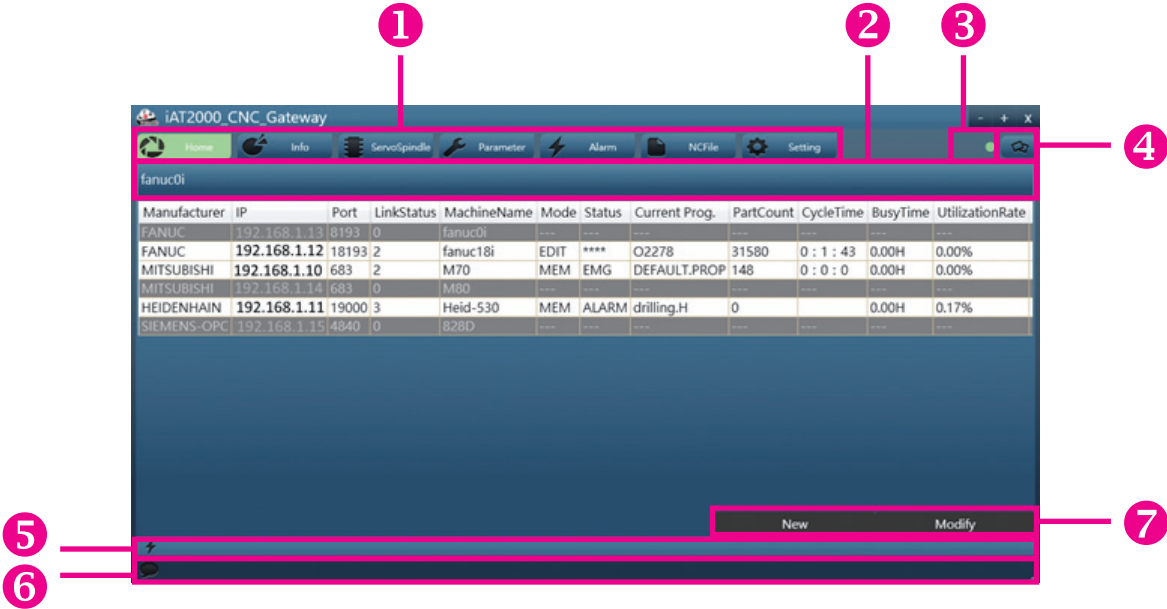
Item No.	Description
1	Menu page buttons for checking machine information.
2	The name of the selected machine.
3	CNC Agent link status light. Red: No connection / Green: Connection is successful
4	Switch the selected machine.
5	Machine alarm and hit message.
6	Operation message.
7	Machine manager buttons for adding, modifying and deleting machines.
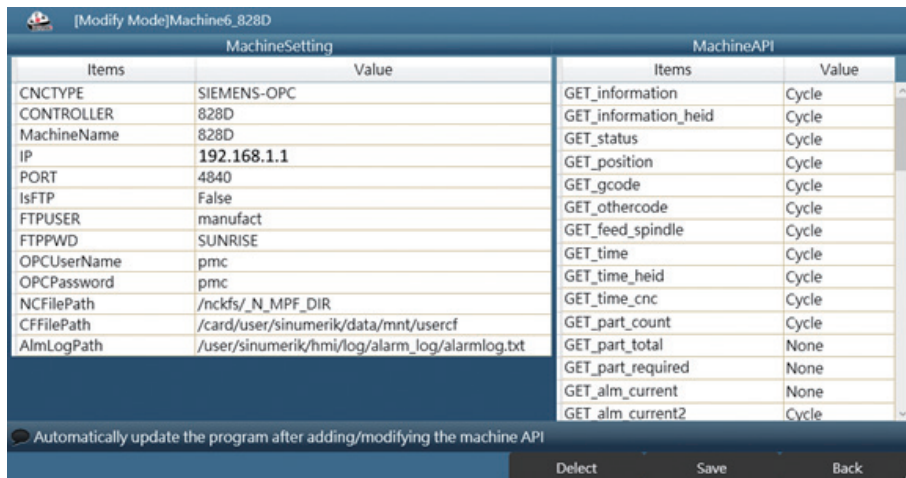
3.4 Set Up a Machine on CNC Gateway

MachineSetting Section

Double-click the machine on the Home page (or click the **New** button to set up a new machine) and open the machine system edit interface. You can set up settings such as machine CNC type, name, IP and port information.

Reminder

1. The CNCTYPE of your controller needs to be defined first. You can type **s** or **f** and it will automatically display **SIEMENS-OPC** or **FANUC** respectively through the autocomplete feature. Change the other settings in the table according to your CNC type.
2. Two or more of the same MachineName cannot be repeated in the list.
3. When setting up a Siemens controller. The **OPCUserName** and **OPCPassword** fields need to be configured.

MachineAPI Section

The CNC Gateway can control the **GET_** parameter information, you can set either the **Cycle**, **None** or **Once** value on your MachineAPI. For example, the data on the CNC for **Get_alm_history** contains large amounts of data, if you set the API value to **Cycle**, the PC, network connection and CNC may become busy. Alternatively, you can set any unused API values to **None**, which will release resources and improve system efficiency.

CHAPTER 4: CNC GATEWAY SQL FUNCTION

4.1 Default SQL Database Information

- You can install MariaDB or MySQL to get information.
- Change MySQL setting on SETTING page of CNC Gateway.

Hostname/IP	localhost
IP Address	127.0.0.1
Port Number	3306
Database Name	iat2000_cnc_gateway
Username	root
Password	cncgateway
Encode Type	UTF-8

4.2 SQL Database Sheet

Sheet Name	Description	Page
alm_current	Current alarm of all the machines, data contains: message, code, class, etc.	50
alm_current_heid	Current alarm of the Heidenhain machine, if the machine's manufacturer is not Heidenhain, the table will be empty.	50
cnc_machine_edit	Remotely configure the machine through this table.	50
cncgateway_errorlist	The CNCGateway error list.	50
cncgateway_loglist	The CNCGateway log list.	51
feed_spindle	Feed and spindle information of all the machines, data contains: override feed, override spindle, actual feed, actual spindle.	51

Sheet Name	Description	Page
gcode	G code of all the machines.	51
information	Information of all the machines, data contains: number of controlled axes, CNC type, and number of max axes, etc.	51
information_heid	Information of the Heidenhain machine, if the machine's manufacturer is not Heidenhain, the table will be empty. [N] is machine index of list.	51
machineN_alm_history	Alarm history of machines, data contains: message, code, time. [N] is machine index of list.	52
machineN_alm_history_heid	Alarm history of the Heidenhain machine, if the machine's manufacturer is not Heidenhain, the table will be empty. [N] is machine index of list.	52
machineN_macro	Macro data list of machines, [N] is machine index of list.	52
machineN_msg_history	Operation history of Fanuc machine, data contains: message, time. [N] is machine index of list.	52
machineN_nc_ftp_list	FTP program list of the machines, data contains: name, time, size, etc. [N] is machine index of list.	52
machineN_nc_mem_list	MEM program list of machines, data contains: name, time, size, etc. [N] is machine index of list.	53
machineN_offset	Offset data or tool table, [N] is machine index of list.	53
machineN_parameter	Parameter data of machines, [N] is machine index of list.	53
machineN_plc_alarm	PLC alarm of the machine, [N] is machine index of list.	54
machineN_plc_status	PLC status of machines, [N] is machine index of list.	54

Sheet Name	Description	Page
machineN_pocket_heid	Pocket data of the Heidenhain machine, [N] is machine index of list.	54
machineN_tool_edge_siemens	Tool data of Siemens machine, [N] is machine index of list.	55
machineN_utilization	Utilization data of machines, [N] is a machine index of list.	55
machineN_workcoord	WorkCoord or datum data of machines, [N] is machine index of list.	56
machineN_work_history	Machine running record of machines, [N] is machine index of list.	56
machinelist	Machine list of all connections, data contains: CNCType, IP, Port, Link status, machine name, CNC status, current program, part count, cycle time and busy time.	56
msg_current	Current alarm of all the machines, data contains: message, code, class, etc.	57
othercode	H Code, D Code, T Code, M Code, B Code, F Code, S Code, etc.	57
parameter_max	The largest number of parameters of all the machines, data contains: machine name, timestamp, parameter number.	57
part_count	Part count of all the machines.	57
part_required	Part required of all the machines. Only FANUC has this item.	57
part_total	Part total of all the machines. Only FANUC has this item.	57
plc_addr_range	PLC address range of all the machines. FANUC and Heidenhain have this item.	57
plc_version	PLC version of all the machines. FANUC and Mitsubishi have this item.	58

Sheet Name	Description	Page
position	Position of all the machines, data contains: unit, machine, absolute, relative and distance coordinates. Heidenhain doesn't have relative position.	58
prog_action	Fill in the machine name, program name, action code and so forth to this table. The database command can modify program in this table. More information at section Program Action.	58
reload_table	Fill the machine name, action string or table name and you can use action to update all the information.	59
servo_current	Servo currents of all the machines, only FANUC has this item.	59
servo_load	Servo load of all the machines.	59
servo_speed	Servo speed of all the machines.	59
servo_temperature	Servo temperature of all the machines.	59
spindle_load	Spindle load of all the machines.	59
spindle_speed	Spindle speed of all the machines.	59
spindle_temperature	Spindle temperature of all the machines.	59
status	Status of all the machines, data contains: main and current program, current line, mode, status and alarm.	60
status_prog	Running program status of all the machines, data contains: current block (255 characters), current program name, main program name, current line number and block pointer.	60
time	Power time, cutting time, cycle time and operation time of all the machines. The format is [hour, min, sec]. Mitsubishi doesn't have cutting time.	60
time_cnc	Machine system time of all the machines. The format is [hour, min, sec]. Heidenhain doesn't have this item.	60

Sheet Name	Description	Page
time_heid	Machine running, machine up, NC up and spindle running time of the Heidenhain machine.	61
utilization_today	Busy time, idle time, alarm time, off time and part total of all the machines on today.	61
write_macro	Fill in the machine name, macro number and value to this table. The database command can modify macro in this table.	61
write_offset	Fill in the machine name, offset number and value to this table. The database command can modify offset in this table.	61
write_workcoord	Fill in the machine name, work coordinates and value to this table. The database command can modify work coordinates in this table.	61

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4.3 SQL Function

4.3.1 Write Command to [reload_table]

MachineName	TableName	Description
all / MachineName	read_macro	[MachineName] is "all", update all machine macro in the list. [MachineName] is one machine in the list that will be updated with the machine macro.
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 to automatically update in cycle time.
all / MachineName	read_all_once	Set all data to automatically update once.
all / MachineName	close_all_cycle	Set all data to close cycle update.

MachineName	TableName	Description
MachineName	write_macro	Update the macro of [write_macro] so that the MachineName Column is the same with machine name.
MachineName	write_offset	Update the offset of [write_offset] so that the MachineName Column is the same with machine name.
MachineName	write_ workcoord	Update the workcoord of [write_workcoord] so that the MachineName Column is the same with machine name.
MachineName	prog_action	According to the command of the [prog_action] table, upload/download/delete the CNC program and set the CNC main program. More information at 0 Program Action.

4.3.2 Example: Write Macro

1. When the program starts, it will automatically create the tables [write_macro] and [cncgateway_errorlist] to the database.
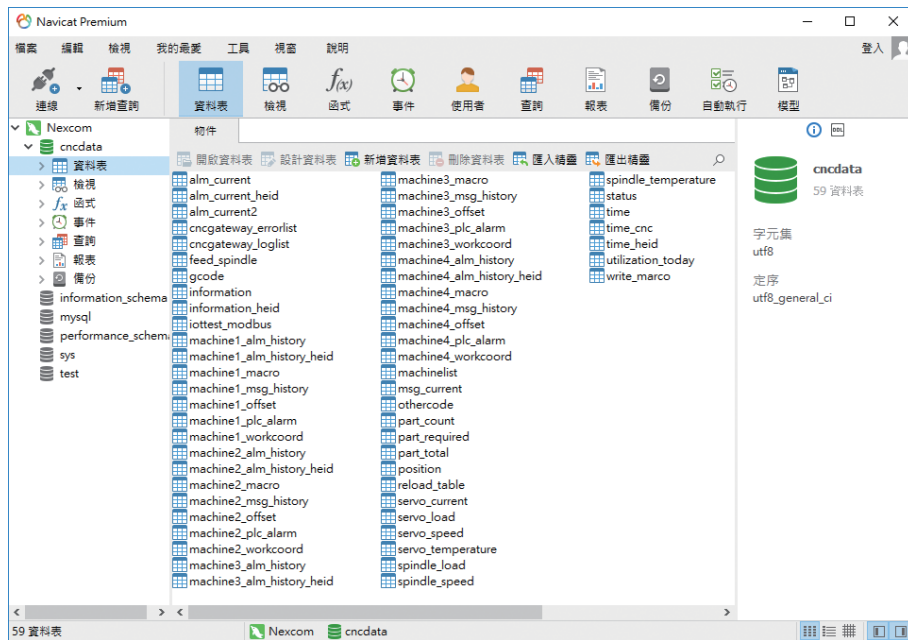
2. Write the MachineName, Number, and Value to [write_macro].

MachineName	Number	Value
fanuc0i	500	500
fanuc18i	506	506
fanuc18i	507	507
fanuc18i	508	508

3. Write the MachineName, TableName and TimeStamp to [reload_table], it will activate the updated action. (The TimeStamp cannot be null, or you can input a space character to TimeStamp instead). iAT2000_CNCGateway will be updated based on [write_macro].

4. If you receive an error during writing, you can find the error message in [cncgateway_errorlist].

4.3.3 Program Action

Column	Description
MachineName	The name of the activated machine.
NcName	CNC program name (includes extension).
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 the program command is downloading, [ProgParh] will be the CNC file download folder path and [NcName] will be the name of the CNC program. If the program command is uploading, [ProgParh] will be the upload file folder path and [NcName] will be the upload file name. If [ProgParh] is empty, [ProgParh] is the default path [C:\iAT2000_CNC_Gateway\NCFile];

4.3.4 Example: Download CNC MEM Program

1. Check if the tables [reload_table] and [prog_action] are available.
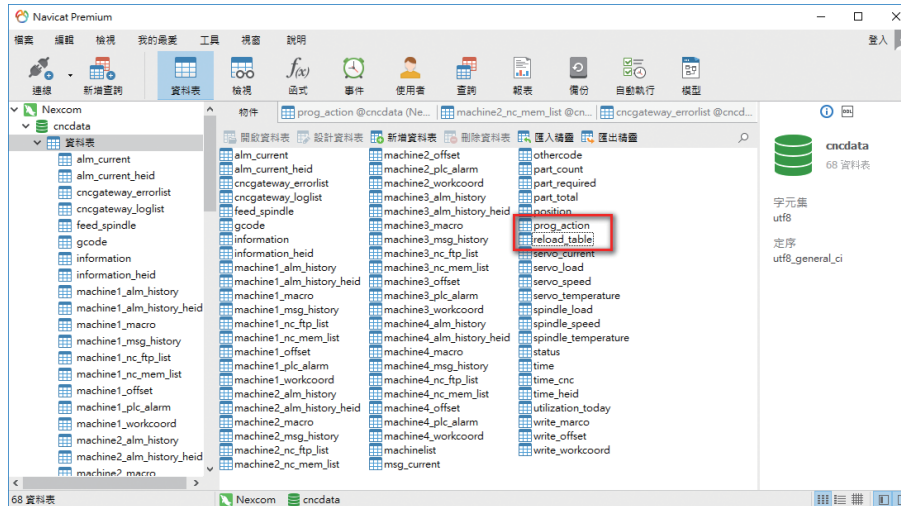
2. Write the MachineName, NcName, ProgComman (command code) and ProgPath (program path) to [prog_action]. [progpath] defines that the download file path will be on the local disk.

3. Write the MachineName, TableName and TimeStamp to [reload_table]. It will activate the Program action. (The TimeStamp cannot be null, or you can input a space character to TimeStamp instead). iAT2000_CNCGateway will be updated based on [prog_action].

4. If you receive an error during writing, you can find the error message in [cncgateway_errorlist].

4.4 Error Code Description

Error Code	Error Class	Description
-999	Error (Disconnect)	There is no connection with the CNC Agent.
-995	Error (Function Mismatch)	There is no matching function when the program is running.
-990	Error	Undefined error.
-901	Error (No Definition)	The data has not been defined when running the function.
-902	Error (Write File)	An error occurred while writing file.
-903	Error (Read File)	An error occurred while reading file.
-904	Error (No Error Code)	Analysis of the response to the problem.
-905	Error (File in Use)	The file to be written is in use.
-31	Camera Exception	Camera has an internal exception error.
-30	Camera Current Running	Camera is currently connected and capturing image.
-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 turn 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	The sensor module or API experienced an 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 Timeout	The function executed has timed out. If you want to lengthen it, please modify the register directly.
-19	CNC Agent Busy	CNC Agent 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.

Error Code	Error Class	Description
-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 expired. Please retry the random key.
-2	Reset or Stop Request	The reset or stop button is pressed. The function was aborted.
-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, Data Number Error)	Check the information on the number and length information.
3	Error (Data Number Error)	Please check if the data number is correct.
4	Error (Data Attribute Error)	Please check if the property information is correct.
5	Error (Data Error)	Written incorrectly.
6	Error (No Option)	CNC did 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 stopped or in emergency.
17	Error (State of Data Protection)	The information is protected by the CNC.
18	Error (Machine ID Not Found)	The machine cannot connect.
19	Error (No Out)	Please confirm NO.
20	Error (Password)	Wrong password.
21	Error (Compatible)	Compatibility issues. (Unable to match the old API).

4.5 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 the alarms, use [,] to split.
	AlmCodeArray	varchar(255)		Alarm code of all the alarms, use [,] to split.
	AlmMsgArray	mediumtext		Alarm message of all the alarms, use [,] to split.
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 the alarms, use [,] to split.
	ErrGroupArray	varchar(255)		Alarm group of all the alarms, use [,] to split.
	ErrClassArray	varchar(255)		Alarm class of all the alarms, use [,] to split.
	ErrMsgArray	mediumtext		Alarm message of all the alarms, use [,] to split.
	ErrDescriptionArray	mediumtext		Alarm description of all the alarms, use [,] to split.
cnc_machine_edit	Timestamp	timestamp		Time of record.
	Manufacturer	varchar(45)		Manufacturer of the machine.
	Controller	varchar(45)		Control type of the machine.
	MachineName	varchar(45)	PRI	Name of the machine.
	IP	varchar(45)		IP address of the machine.
	Port	varchar(45)		IP port of the machine.
	DSName	varchar(45)		Data server name of the machine.
	DSPWD	varchar(45)		Data server password of the machine.
	OPCName	varchar(45)		OPC UA name of the machine.
	OPCPWD	varchar(45)		OPC UA password of the machine.
	MachineIndex	tinyint(4)		Index of the machine.
	Status	tinyint(4)		CNC status of the machine.
cncgateway_errorlist	TimeStamp	datetime		Time of record.
	Message	text		Message of gateway error.

Tables	Field	Type	Key	Description
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)		G code list, use [,] to split.
information	MachineName	varchar(45)	PRI	Name of the machine.
	TimeStamp	datetime		Time of record.
	Axes	int(11)		Enable count of axes.
	AxisNameArray	varchar(255)		Enable number of axes, use [,] to split.
	CncType	varchar(45)		Product number of CNC.
	MaxAxes	int(11)		Maximum count of axes.
	Nc_Ver	varchar(45)		NC versions
	Series	varchar(45)		Types of CNC, such as: milling, turning, etc.
information_heid	MachineName	varchar(45)	PRI	Name of the machine.
	TimeStamp	datetime		Time of record.
	Axes	int(11)		Enable count of axes.
	AxisNameArray	varchar(255)		Enable number of axes, use [,] to split.
	FCL	varchar(45)		
	Model	varchar(45)		
	Nc_Ver	varchar(45)		NC versions.
	Plc_Ver	varchar(45)		PLC versions.

Tables	Field	Type	Key	Description
machineN_alm_history	MachineName	varchar(45)		Name of the machine.
	TimeStamp	datetime	PRI	Time of record.
	AlmClass	varchar(45)		Alarm class.
	AlmCode	varchar(45)		Alarm code.
	AlmDate	varchar(255)		Alarm date time.
	AlmMsg	varchar(1024)		Alarm message.
machineN_alm_history_heid	MachineName	varchar(45)	PRI	Name of the machine.
	Timestamp	datetime		Time of record.
	ErrNumber	int(11)		Alarm number.
	ErrGroup	varchar(45)		Alarm group.
	ErrClass	varchar(45)		Alarm class.
	ErrMsg	varchar(255)		Alarm message.
	ErrDescription	text		Alarm description.
	ErrDate	varchar(255)		Alarm date.
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)		Operation code.
	MsgDate	varchar(255)	PRI	Operation date and time.
	MsgText	varchar(255)		Operation message.
machineN_nc_ftp_list	MachineName	varchar(45)		Name of the machine.
	TimeStamp	datetime		Time of record.
	NcName	varchar(45)	PRI	Name of the FTP programs.
	Size	int(11)		Size (byte) of the FTP programs.
	DateTime	varchar(255)		Date and time of the FTP programs.
	FD	varchar(45)		Data type, file or directory.

Tables	Field	Type	Key	Description
machineN_nc_mem_list	MachineName	varchar(45)		Name of the machine.
	TimeStamp	datetime		Time of record.
	NcName	varchar(45)	PRI	Name of the memory programs.
	Size	int(11)		Size (byte) of the memory programs.
	DateTime	varchar(255)		Date and time of the memory programs, it is dependent on the brand.
	Remark	varchar(45)		Remark of the memory programs, it is dependent 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)		Offset type count.
	ColumnName	varchar(512)		Name of Offset type, use [,] to split.
	Number	varchar(45)	PRI	Offset number.
	Column1~10	varchar(255)		The contents of Column 1 to 10 are sorted in the order of first to last in [ColumnName]. For example: ColumnName= [LENGTH GEOM, LENGTH WEAR, RADIUS GEOM, RADIUS WEAR], then the columns would be in the following order: Column1= LENGTH GEOM Column2= LENGTH WEAR Column3= RADIUS GEOM Column4= RADIUS WEAR
machineN_parameter	MachineName	varchar(45)		Name of the machine.
	TimeStamp	datetime		Time of record.
	Number	int(11)	PRI	Parameter number.
	Type	tinyint(4)		Value type of the machine. -1: not defined 0:binary 1:int 2:double 3:string

Tables	Field	Type	Key	Description
	Multi	tinyint(4)		Multi value type of the machine. 0: single value. 1: multidimensional or multi-axis.
	DataString	varchar(512)		Parameter value of the machine. (String type)
	Status	tinyint(4)		Undefined.
machineN_plc_alarm	MachineName	varchar(45)		Name of the machine.
	TimeStamp	datetime		Time of record.
	AlmMsg	varchar(255)		Description of the PLC alarm.
machineN_plc_status	MachineName	varchar(45)		Name of machine.
	TimeStamp	datetime		Time of record.
	Address	varchar(45)	PRI	PLC address. For example: R7001, DB9000. DBB0014.
	Class	varchar(45)		PLC class. For example: R is class on R7001.
	Number	Int(11)		PLC number. For example: 7001 is number on R7001.
	Type	tinyint(4)		Value type of the machine. -1: not defined. 0: byte 1: short 2: int 3: bool 4: double 5: string 6: sbyte
	DataString	varchar(45)		PLC value of the machine. (String type)
	Status	tinyint(4)		Undefined
machineN_pocket_heid	MachineName	varchar (45)		Name of the machine.
	TimeStamp	datetime		Time of record.
	ColumnCount	tinyint(4)		Pocket type count.
	Column Name	varchar(512)		Name of the Pocket type, use [,] to split.
	Number	Int(11)	PRI	Offset Number.

Tables	Field	Type	Key	Description
	Column1~25	varchar(255)		The contents of Column 1 to 25 are sorted in order of first to last in [ColumnName]. For example: ColumnName=[T,ST,F,L,PLC,TNAME, DOC...], then the column order would be Column1=T, Column2=S and so on.
machineN_tool_edge_siemens	MachineName	varchar(45)		Name of the machine.
	TimeStamp	datetime		Time of record.
	ColumnCount	tinyint(4)		Value type count of tool.
	ColumnName	varchar(512)		Name of tool value type, use [,] to split.
	Number	int(11)	PRI	Tool number.
	EdgeNoCount	int(11)		Edge count.
	EdgeNo	int(11)	PRI	Tool edge number.
	Column1~50	varchar(255)		The contents of Column 1 to 50 are sorted in order of first to last in [ColumnName]. For example: ColumnName = [Tool type, Tool edge location, GEOM LENGTH1, GEOM LENGTH2, ...], then the column order would be Column1= Tool type, Column2= Tool edge location, Column3= GEOM LENGTH1
machineN_utilization	MachineName	varchar(45)		Name of the machine.
	TimeStamp	datetime	PRI	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.
	UtilizationRate	double		Utilization rae of the machine.
	PartCount	int(11)		Part count of the machine.

Tables	Field	Type	Key	Description
machineN_work_history	MachineName	varchar(45)		Name of the machine.
	TimeStamp	datetime		Name of record.
	LinkStatus	int(11)		Connection status of the machine.
	Intervals	double		Duration of the connection status.
	StartTime	datetime	PRI	Start time of connection status.
	EndTime	datetime		End time of connection status.
	MainProg	varchar(255)		Main program of the machine.
	CurProg	varchar(255)		Current program of the machine.
	PartCount	varchar(45)		Part count of the machine.
machineN_workcoord	MachineName	varchar(45)		Name of the machine
	Timestamp	datetime		Time of record.
	ColumnCount	tinyint(4)		Work coordinates type count.
	ColumnName	varchar(255)		Name of work coordinates, use [,] to split.
	CoodName	varchar(45)	PRI	Work coordinates name.
	Column1~10	varchar(255)		The contents of Column1 to 10 are sorted in the order of first to last in [ColumnName]. For example: ColumnName=[X,Y,Z], then the column order would be Column1= X, Column2= Y,Column3= Z. machinelist TimeStamp datetime Time of record.
machinelist	TimeStamp	datetime		Time of record.
	Manufacturer	varchar(45)		Manufacturer of the machine
	IP	varchar(45)		IP address of the machine.
	Port	varchar(45)		IP port of the machine.
	LinkStatus	int(11)		Connection status of the machine.
	MachineName	varchar(45)	PRI	Name of the machine.
	Mode	varchar(45)		CNC mode of the machine.
	Status	varchar(45)		CNC status of the machine.
	CurProg	varchar(45)		Current program of the machine.
	PartCount	varchar(45)		Part count of the machine.
	CycleTime	varchar(45)		Cycle time of the machine.
	BusyTime	varchar(45)		Busy time of the machine.
	UtilizationRate	varchar(150)		Utilization rate of the machine.
	MachineIndex	Tinyint(244)		Index of the machine.

Tables	Field	Type	Key	Description
msg_current	MachineName	varchar(45)	PRI	Name of the machine.
	TimeStamp	datetime		Time of record.
	IsMsg	tinyint(1)		Status of the current operation message.
	MsgCode	smallint(6)		Code of the current operation.
	MsgText	varchar(255)		Context of the current operation.
othercode	MachineName	varchar(45)	PRI	Name of the machine.
	TimeStamp	datetime		Time of record.
	BCode	int(11)		B Code. It is dependent on Mitsubishi.
	DCode	int(11)		D Code. Heidenhain doesn't have this item.
	FCode	int(11)		F Code
	HCode	int(11)		H Code. Heidenhain doesn't have this item.
	MCode	int(11)		M Code
	SCode	int(11)		S Code
	TCode	int(11)		T Code
parameter_max	MachineName	varchar(45)	PRI	Name of the machine.
	TimeStamp	datetime		Time of record.
	ParameterMax	int(11)		Maximum parameter number of the machine.
part_count	MachineName	varchar(45)	PRI	Name of the machine.
	TimeStamp	datetime		Time of record.
	PartCount	int(11)		Part count of the machine.
part_required	MachineName	varchar(45)	PRI	Name of the machine
	TimeStamp	datetime		Time of record.
	PartRequired	int(11)		Part required of the machine.
part_total	MachineName	varchar(45)	PRI	Name of the machine.
	TimeStamp	datetime		Time of record.
	PartTotal	int(11)		Part total of the machine.
plc_addr_rang	MachineName	varchar(45)	PRI1	Name of the machine.
	TimeStamp	datetime		Time of record.
	Class	varchar(45)	PRI2	PLC class. For example: R is a class of R7001
	PlcStart	int(11)	PRI3	Start number of PLC class.
	Plc End	int(11)		End number of PLC class.

Tables	Field	Type	Key	Description
	PlcType	tinyint(4)		Value type of the machine. -1: not defined. 0: byte 1: short 2: int 3: bool 4: double 5: string 6: sbyte
plc_version	MachineName	varchar(45)	PRI	Name of the machine.
	TimeStamp	datetime		Time of record.
	Version	varchar(255)		PLC version of the machine.
	Date	date		Last update date.
	Designed	varchar(255)		PLC designer of the 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 sorted in the order of first to last in [AxisNameArray].
	AxisNameArray	varchar(255)		Enable the number of axes, use [,] to split.
	DecPoint	int(11)		Coordinate decimal point.
	DistArray	varchar(255)		Remaining distance coordinates list, use [,] to split. The contexts are sorted in the order of first to last in [AxisNameArray].
	MachArray	varchar(255)		Mechanical coordinate list, use [,] to split. The contexts are sorted in the order of first to last in [AxisNameArray].
	RelArray	varchar(255)		Relative coordinate list, use [,] to split. The contexts are sorted in the order of first to last in [AxisNameArray].
	UnitArray	varchar(255)		Coordinate unit for each axis.
prog_action	MachineName	varchar(100)		Name of the machine.
	NcName	varchar(100)	PRI	Name of the program that will be operated.
	ProgComman	int(11)		Command number.
	ProgPath	text		The local path of the program to upload or download to.

Tables	Field	Type	Key	Description
reload_table	MachineName	varchar(45)	PRI	Name of the machine.
	TableName	text		Table name or command.
	TimeStamp	text		Action time of the record.
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 sorted in the order of first to last in [AxisNameArray].
servo_load	MachineName	varchar(45)	PRI	Name of the machine.
	TimeStamp	datetime		Time of record.
	ServoLoadPercentArray	varchar(255)		Servo load list, use [,] to split. The contexts are sorted in the order of first to last in [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 sorted in the order of first to last in [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 sorted in the order of first to last in [AxisNameArray]. It is dependent 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.

Tables	Field	Type	Key	Description
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 number.
	Emg	varchar(45)		Emergency stop, [EMG] or [****].
	MainProg	varchar(45)		Main program.
	Mode	varchar(45)		CNC mode of the machine.
	Status	varchar(45)		CNC status of the machine.
	BlkPointer	varchar(45)		Current program line number.
status_prog	MachineName	varchar(45)	PRI	Name of the machine.
	TimeStamp	datetime		Time of record.
	CurrentBlock	varchar(512)		The existing section of the CNC is only reading 256 characters in length.
	CurProg	varchar(45)		Current program.
	MainProg	varchar(45)		Main program.
	CurSeq	int(11)		Current sequence N line number.
	BlkPointer	varchar(45)		Current program line number.
time	MachineName	varchar(45)	PRI	Name of the machine.
	TimeStamp	datetime		Time of record.
	CuttingArray	varchar(255)		Cutting time of the machine, format is [hh,mm,ss].
	CycleArray	varchar(255)		Cycle time of the machine, format is [hh,mm,ss].
	OperationArray	varchar(255)		Operation time of the machine, format is [hh,mm,ss].
	PowerArray	varchar(255)		Power time of the 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 the machine, format is [yyyy,mm,dd,hh,mm,ss].

Tables	Field	Type	Key	Description
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 that the spindle has been operating (M3 or M4).
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.
	UtilizationRate	double		Utilization rate of the machine.
	PartCount	int(11)		Part count of the machine.
write_macro	MachineName	varchar(45)		Name of the machine.
	Number	int(11)		Number of the marco setting.
	Value	double		Value of the macro setting.
write_offset	MachineName	varchar(45)		Name of the machine.
	Number	int(11)		Number of the offset setting.
	ColumnCount	tinyint(4)		Count of the offset value setting.
	C1~10	double		C1~10 are sorted in the order of offset [ColumnName].
write_workcoord	MachineName	varchar(45)		Name of the machine.
	Number	varchar(255)		Number of work coordinates setting.
	ColumnCount	tinyint(4)		Count of work coordinates value setting.
	Axis1~8	double		Axis1~8 are sorted in the order of offset [ColumnName].

APPENDIX A: POWER CONSUMPTION

Power Consumption Management

Purpose

The purpose of the power consumption test is to verify the power dissipation of system, and the loading of power supply.

Test Equipment

PROVA CM-07 AC/DC CLAMP METER

Device Under Test

DUT: sys#1/

Test Procedure

1. Power up the DUT, boot into Windows 7 x32 Professional.
2. Entering standby mode (HDD power down).
3. Measure the power consumption and record it.
4. Run Burn-in test program to apply 100% full loading.
5. Measure the power consumption and record it.

Test Data

	Sys #1
	+24V
Full-Loading Mode	2.1A
Total	50.4W
Standby S3 Mode	0.4A
Total	9.8W

APPENDIX B: VERSION HISTORY

Item	Description	Update Date	Guide Version	CNC Gateway Version
1	First edition	2019/1/2	Ver. 1.0	1.0.1
2	Update with Ver 1.0.4	2019/10/17	Ver. 2.0	1.0.4
3	Update with Ver 1.4.7 and hardware information	2021/7/21	Ver 3.0	1.4.7

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