

## 4.2 OPC UA

### 4.2.1 Overview

When this machine is set as an OPC UA server, the user can read and write the information from the machine on the OPC UA client. The user can monitor and control this machine from the OPC UA client in the host system (SCADA: Supervisory Control And Data Acquisition, MES: Manufacturing Execution System, etc.).

- \* It is required to connect the machine to the network and make settings for the network beforehand. Refer to the “3.5 Communication protocol” for further details.

Use the value set in the communication parameter <Host name> or <IP address>, and specify the URL (address) as shown below for the OPC UA client.

opc.tcp:// host name (or IP address):4840/

The port number is fixed at 4840, and a maximum of ten compatible OPC UA clients can be connected.

4

- (NOTE) When an attempt is made to make another connection after the OPC UA client has reached the maximum available connections, the following status code is returned to the connection request from the OPC UA client: BadTooManySessions(0x80560000).

### 4.2.2 Security Functions

The OPC UA server security functions are set in the communication parameter (Ethernet/FTP): <Server user name>, <Password as server> and <OPC UA security communication>.

Communication parameter	Value	Description
<Server user name> <Password as server>	Set	Verifies the user with a user name and password and then connects to the network.
	Not set	Connects to the network without verifying the user and without a user name. (NOTE 1)
<OPC UA security communication>	0: None	Operates without a OPC UA security policy. Communication is carried out without security.
	1: Basic128Rsa15	Operates with a “Sign and encrypt” OPC UA security policy. (NOTE 2)
	2: Basic256	In the communication, messages are signed to prevent falsification and encrypted to prevent tapping.

- (NOTE 1) When the communication parameter (Ethernet/FTP) <Restrict Ethernet access> is set to <1: Yes>, if <Server user name> and <Password as server> are not set, then the OPC UA server function is disabled. When the OPC UA client is connected while the OPC UA server function is disabled, the following status code is returned to the connection request: BadTepInternalError(0x80820000).

- (NOTE 2) If the <OPC UA security communication> is set to another setting besides <0: None>, then the user needs to input the server certificate for this machine and input the certificate for the connecting OPC UA client as an OPC UA client certificate. If there is no valid server certificate for this machine, then the alarm <<Security communication error>> is triggered and the OPC UA server is not enabled. If the connecting OPC UA client certificate is not input, then the status code: BadCertificateUntrusted(0x801A0000) is returned for the connection request from the OPC UA client. Refer to “3.4.10 Certificate input/output” for details about the certificate input operations.

- (NOTE 3) If a certificate warning is displayed when accessing the OPC UA server, this machine’s server certificate, or a certificate for the certificate authority who issued this machine’s server certificate must be registered as a trusted certificate. Follow the instructions on each client to register the certificate.

### 4.2.3 Data Structure

The nodes on the OPC UA server are shown below in the address space that is expressed in a tree structure. The user can specify the ID node for each node and read and write information with the OPC UA client.

#### 4.2.3.1 Description of figures

	: Object node
	: Folder node
	: Variable node
	: Property node
	: Function node

#### 4.2.3.2 Overall structure

Tree structure	Name	Node ID
	Root	i=84
	Objects	i=85
	BrotherMC	s=BrotherMC
	ATC	s=ATC
	I/O	s=IO
	Machine	s=Machine
	NC	s=NC
	Panel	s=Panel
	PLC	s=PLC
	Resources	s=Resources
	DataBank	s=Resources/DataBank
	Directory	s=Resources/Directory
	MemoryCard	s=Resources/MemoryCard
	Types	i=86
	View	i=87

4

#### Node description

Name	Read & write	Data type	Description
Root	Not available	-	This is the root node of the address space. It is an OPC UA prescribed node.
Objects	Not available	-	This is the object folder node on the OPC UA server. It is an OPC UA prescribed node.
BrotherMC	Not available	-	This is an object node related to this machine.
ATC	Not available	-	This is an object node related to the ATC.
I/O	Not available	-	This is an object node related to external I/O signals.
Machine	Not available	-	This is an object node related to the machine.
NC	Not available	-	This is an object node related to the control unit.
Panel	Not available	-	This is an object node related to the operation panel.
PLC	Not available	-	This is an object node related to the internal PLC.
Resources	Not available	-	This is an object node related to the resources.
DataBank	Not available	-	This is an object node related to the data banks inside the resources.
Directory	Not available	-	This is an object node related to the files and folders inside the resources.

Name	Read & write	Data type	Description
MemoryCard	Not available	-	This is an object node related to the memory card inside the resources.
Types	Not available	-	This is a folder node for type definitions on the OPC UA server. It is an OPC UA prescribed node.
View	Not available	-	This is a view folder node on the OPC UA server. It is an OPC UA prescribed node.

#### 4.2.3.3 ATC node

Tree structure	Name	Node ID
ATC	s=ATC	
Data	s=ATC/Data	
ATCTL	s=ATC/Data/ATCTL	
M01	s=ATC/Data/ATCTL/M01	
M	s=ATC/Data/ATCTL/M01/M	
S	s=ATC/Data/ATCTL/M01/S	
K	s=ATC/Data/ATCTL/M01/K	
C	s=ATC/Data/ATCTL/M01/C	
M02	s=ATC/Data/ATCTL/M02	
...	...	
M51	s=ATC/Data/ATCTL/M51	

##### Node description

Name	Read & write	Data type	Description
Data	Not available	-	This is an object node related to the ATC tool data.
ATCTL	Available	String	This acquires or sets the ATC tool data. Refer to “3.6.4 File format” for details on formatting.
M**(**=01~51)	Not available	-	This is a variable node related to the ATC tool data.
M	Available	String	This acquires or sets the tool number for the specified ATC tool data. (NOTE) If a null character is set to the value, the tool number is deleted.
S	Available	String	This acquires or sets the group number (NC language) / main tool number (conversation language) for the specified ATC tool data.
K	Available	String	This acquires or sets the tool type for the specified ATC tool data.
C	Available	String	This acquires or sets the graph color for the specified ATC tool data.

#### 4.2.3.4 I/O node

Tree structure	Name	Node ID
I/O	s=IO	
Data	s=IO/Data	
ExternalIOSignal	s=IO/Data/ExternalIOSignal	
Name	s=IO/Data/ExternalIOSignal/Name	
MOUT	s=IO/Data/MOUT	
IO	s=IO/Data/IO	

Node description

Name	Read & write	Data type	Description
Data	Not available	-	This is an object node related to I/O signals.
ExternalIOSignal	Available	Boolean	This acquires or sets the external I/O signals.
Name	Available	String	This acquires or sets the node for the external I/O signals after setting the signal name that reads and writes for the name node. Refer to the “3.5 Communication protocol” for details about the signal names.
MOUT	For reading only	String	This acquires the auxiliary function numbers during output.
IO	For reading only	String	This acquires the I/O data.

**4.2.3.5 Machine node**

Tree structure	Name	Node ID
	Machine	s=Machine
	Data	s=Machine/Data
	HEAC	s=Machine/Data/HEAC
	Name	s=Machine/Data/HEAC/Name
	NameFormat	s=Machine/Data/HEAC/NameFormat
	MCHLOG	s=Machine/Data/MCHLOG
	SYSD89	s=Machine/Data/SYSD89
	SYSD94	s=Machine/Data/SYSD94
	SYSD95	s=Machine/Data/SYSD95
	SYSD96	s=Machine/Data/SYSD96
	SYSD97	s=Machine/Data/SYSD97
	SYSD98	s=Machine/Data/SYSD98
	SYSD99	s=Machine/Data/SYSD99

4

Node description

Name	Read & write	Data type	Description
Data	Not available	-	This is an object node related to the machine data.
HEAC	For reading only	String	This acquires the automatic thermal distortion compensation data.
Name	Available	String	This acquires the HEAC node after setting the data name for the name node.
NameFormat	For reading only	String	The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6.4 File format” for details on the data format of the automatic thermal distortion compensation. Refer to “3.6 Communication data details” for details on the format of the data names.
MCHLOG	For reading only	String	This acquires the machine characteristics log data.
SYSD89	Available	ByteString	This acquires or sets the machine data 11.
SYSD94	Available	String	This acquires or sets the machine data 6.
SYSD95	Available	String	This acquires or sets the machine data 5.
SYSD96	Available	String	This acquires or sets the machine data 4.
SYSD97	Available	String	This acquires or sets the machine data 3.
SYSD98	Available	String	This acquires or sets the machine data 2.
SYSD99	Available	String	This acquires or sets the machine data 1.

#### 4.2.3.6 NC node

4

Tree structure	Name	Node ID
NC	NC	s=NC
Accessory	Accessory	s=NC/Accessory
SHTCUT	SHTCUT	s=NC/Accessory/SHTCUT
Alarm	Alarm	s=NC/Alarm
ALARM	ALARM	s=NC/Alarm/ALARM
CRLOG	CRLOG	s=NC/Alarm/CRLOG
LOG	LOG	s=NC/Alarm/LOG
LOGBK	LOGBK	s=NC/Alarm/LOGBK
MemoryOperation	MemoryOperation	s=NC/MemoryOperation
MEM	MEM	s=NC/MemoryOperation/MEM
RunningProgram	RunningProgram	s=NC/MemoryOperation/RunningProgram
FileValue	FileValue	s=NC/MemoryOperation/RunningProgram/FileValue
Length	Length	s=NC/MemoryOperation/RunningProgram/FileValue/Length
SelectedProgram	SelectedProgram	s=NC/MemoryOperation/SelectedProgram
StartPalletProgram	StartPalletProgram	s=NC/MemoryOperation/StartPalletProgram
InputArguments	InputArguments	s=NC/MemoryOperation/StartPalletProgram/InputArguments
StartProgram	StartProgram	s=NC/MemoryOperation/StartProgram
InputArguments	InputArguments	s=NC/MemoryOperation/StartProgram/InputArguments
StopProgram	StopProgram	s=NC/MemoryOperation/StopProgram
InputArguments	InputArguments	s=NC/MemoryOperation/StopProgram/InputArguments
ProductionMonitor	ProductionMonitor	s=NC/ProductionMonitor
MAINTC	MAINTC	s=NC/ProductionMonitor/MAINTC
MONTR	MONTR	s=NC/ProductionMonitor/MONTR
MSRRSD	MSRRSD	s=NC/ProductionMonitor/MSRRSD
PRDD1	PRDD1	s=NC/ProductionMonitor/PRDD1
PRDD2	PRDD2	s=NC/ProductionMonitor/PRDD2
PRDD3	PRDD3	s=NC/ProductionMonitor/PRDD3
WKCNTR	WKCNTR	s=NC/ProductionMonitor/WKCNTR
SupportApplication	SupportApplication	s=NC/SupportApplication
EPLOG	EPLOG	s=NC/SupportApplication/EPLOG
HOME	HOME	s=NC/SupportApplication/HOME
PAINTD	PAINTD	s=NC/SupportApplication/PAINTD
WVPRM	WVPRM	s=NC/SupportApplication/WVPRM
System	System	s=NC/System
Date	Date	s=NC/System/Date
H/D_Modal	H/D_Modal	s=NC/System/HD_Modal

Tree structure	Name	Node ID
└─ Mode	Mode	s=NC/System/Mode
└─ OperationTime	OperationTime	s=NC/System/OperationTime
└─ PDSP	PDSP	s=NC/System/PDSP
└─ RelativeCoordOffset	RelativeCoordOffset	s=NC/System/RelativeCoordOffset
└─ Axis_X	Axis_X	s=NC/System/RelativeCoordOffset/Axis_X
└─ ...	...	...
└─ Axis_P4	Axis_P4	s=NC/System/RelativeCoordOffset/Axis_P4
└─ VER	VER	s=NC/System/VER
└─ PRTCTD	PRTCTD	s=NC/System/PRTCTD
└─ RQC	RQC	s=NC/System/RQC

## Node description

Name	Read & write	Data type	Description
Accessory	Not available	-	This is an object node related to the accessories.
SHTCUT	Available	String	This acquires or sets the bookmark data.
Alarm	Not available	-	This is an object node related to the alarms.
ALARM	For reading only	String	This acquires the current alarm data. Refer to “3.6.4 File format” for details on formatting.
CRLOG	For reading only	String	This acquires the collision log data.
LOG	For reading only	String	This acquires the alarm log data (up to data record No. 100). Refer to “3.6.4 File format” for details on formatting.
LOGBK	For reading only	String	This acquires the alarm log data (from data record No. 101). Refer to “3.6.4 File format” for details on formatting.
MemoryOperation	Not available	-	This is an object node related to memory operation.
MEM	For reading only	String	This acquires the memory operation data. Refer to “3.6.4 File format” for details on formatting.
RunningProgram	For reading only	String[]	This acquires the operating program information. [0]: Executing program [1]: Main program [2]: Executing block number
FileValue	For reading only	String	This acquires the executing program. This acquires the file value after setting the file size for acquiring to the length node.
Length	Available	Int32	When -1 is set to the length node, the length of the number of characters displayed onto the screen is acquired.
SelectedProgram	Available	String	This acquires or sets the selected program.
StartPalletProgram	-	Function	This uses the start pallet for the program operation.
StartPalletProgram/ InputArguments	Available	String	This executes the start pallet program node after setting the program name to the input arguments node.
StartProgram	-	Function	This starts the program operation.
StartProgram/ InputArguments	Available	String	This executes the start program node after setting the program name to the input arguments node.
StopProgram	-	Function	This stops the program operation.
StopProgram/ InputArguments	Available	String	This executes the stop program node after setting “whether the [FEED HOLD] switch is pressed or not” to the input arguments node.
ProductionMonitor	Not available	-	This is an object node related to the production monitor.
MAINTC	Available	String	This acquires or sets the maintenance notice. Refer to “3.6.4 File format” for details on formatting.
MONTR	For reading only	String	This acquires the machine monitor data (production data 4). Refer to “3.6.4 File format” for details on formatting.
MSRRSD	Available	String	This acquires or sets the measurement results. Refer to “3.6.4 File format” for details on formatting.
PRDD1	Available	String	This acquires or sets production data 1.

## Chapter 4 Server Functions

Name	Read & write	Data type	Description
PRDD2	Available	String	This acquires or sets production data 2. Refer to “3.6.4 File format” for details on formatting.
PRDD3	Available	String	This acquires or sets production data 3. Refer to “3.6.4 File format” for details on formatting.
WKCNTR	Available	String	This acquires or sets the workpiece counter. Refer to “3.6.4 File format” for details on formatting.
SupportApplication	Not available	-	This is an object node related to the support application.
EPLOG	For reading only	String	This acquires the power consumption log data. Refer to “3.6.4 File format” for details on formatting.
HOME	Available	String	This acquires or sets the home screen settings.
PAINTD	Available	String	This acquires or sets the graph data.
WVPRM	Available	String	This acquires or sets the waveform display parameter.
System	Not available	-	This is an object node related to the control unit system.
Date	Available	String	This acquires or sets the date and time. The format is as follows: The date is shown as follows from the header: Year (4 digits), month (2 digits), day (2 digits), hour (2 digits), minutes (2 digits), seconds (2 digits). Ex: December 31, 2020, 23:59:59 → 20201231235959
H/D_Modal	For reading only	String[]	This acquires H/D modal. [0]: H modal [1]: D modal
Mode	Available	String	This acquires or sets the mode. The format is as follows: MNL: Manual mode MDI: MDI mode MEM: Memory operation mode EDIT: Program edit mode
OperationTime	Available	String	This acquires or sets the operation time. The format is as follows: The time from the header: Hour (4 digits), minutes (2 digits), seconds (2 digits). Ex: 1 hr., 1 min., 1 sec. → 00010101
PDSP	For reading only	String	This acquires the position data. The format is the same as the data that is processed with the external input and output. Refer to “3.6.4 File format” for details on formatting.
RelativeCoordOffset	For reading only	String	This is a variable node related to the relative coordinates offset data.
Axis_** (**=X,Y,Z,4,5,6,7, 8,P1~P4)	Available	String	This acquires or sets the offset for the relative coordinate position of the specified axis number. Issue an offset command with a decimal point. If there is no decimal point, then the value is processed as an integer.
VER	For reading only	String	This acquires the version data. Refer to “3.6.4 File format” for details on formatting.
PRTCTD	Available	ByteString	This acquires or sets the operation level data.
RQC	For reading only	String	This acquires the request code. Refer to “3.6.4 File format” for details on formatting.

### 4.2.3.7 Panel node

Tree structure	Name	Node ID
Panel	s=Panel	
Data	s=Panel/Data	
OPLOG	s=Panel/Data/OPLOG	
PANEL	s=Panel/Data/PANEL	
Keys	s=Panel/Keys	
B.SKIP	s=Panel/Keys/B.SKIP	
DRY	s=Panel/Keys/DRY	
M.LCK	s=Panel/Keys/M.LCK	
OP.STP	s=Panel/Keys/OP.STP	
SINGL	s=Panel/Keys/SINGL	

4

#### Node description

Name	Read & write	Data type	Description
Data	Not available	-	This is an object node related to the operation panel data.
OPLOG	For reading only	ByteString	This acquires the operation log.
PANEL	For reading only	String	This acquires the operation panel data. Refer to “3.6.4 File format” for details on formatting.
Keys	Not available	-	This is an object node related to the operation panel keys.
B.SKIP	Available	Boolean	This acquires or sets the [B.SKIP] key status. True: ON False: OFF
DRY	Available	Boolean	This acquires or sets the [DRY] key status. True: ON False: OFF
M.LCK	Available	Boolean	This acquires or sets the [MLCK] key status. True: ON False: OFF
OP.STP	Available	Boolean	This acquires or sets the [Optional stop] key status. True: ON False: OFF
SINGL	Available	Boolean	This acquires or sets the [SINGL.] key status. True: ON False: OFF

## 4.2.3.8 PLC node

4

Tree structure	Name	Node ID
PLC	PLC	s=PLC
Data	Data	s=PLC/Data
PLCDAT	PLCDAT	s=PLC/Data/PLCDAT
PLCMON	PLCMON	s=PLC/Data/PLCMON
PLCPRJ	PLCPRJ	s=PLC/Data/PLCPRJ
SignalData	SignalData	s=PLC/Data/SignalData
Name	Name	s=PLC/Data/SignalData/Name
M	M	s=PLC/Data/M
M00000	M00000	s=PLC/Data/M/M00000
...	...	...
D	D	s=PLC/Data/D
D0000	D0000	s=PLC/Data/D/D0000
...	...	...

## Node description

Name	Read & write	Data type	Description
Data	Not available	-	This is an object node related to the PLC data.
PLCDAT	Available	ByteString	This acquires or sets the PLC signal data.
PLCMON	Available	String	This acquires or sets the PLC registration monitor.
PLCPRJ	Available	ByteString	This acquires or sets the PLC program.
SignalData	Available	Int32	This acquires or sets the specified PLC signal data.
Name	Available	String	This acquires or sets the node for the Signal Data after setting the address that reads and writes to the name node. Refer to "Chapter 4 OM" in the PLC System Manual for details on the signal names.
M	Not available	-	This is the folder node for the PLC internal relay.
M***** (*****=00000~10239) decimals	Available	Boolean	This acquires or sets the PLC internal relay.
D	Not available	-	This is the folder node for the PLC data register (word).
D**** (****=0000~8191) decimals	Available	Int16	This acquires or sets the PLC data register (word).

#### 4.2.3.9 Data bank node

Tree structure	Name	Node ID
	DataBase	s=Resources/DataBank
└	CurrentDataBanks	s=Resources/DataBank/CurrentDataBanks
└	CMPRD	s=Resources/DataBank/CMPRD
└	Name	s=Resources/DataBank/CMPRD/Name
└	NameFormat	s=Resources/DataBank/CMPRD/NameFormat
└	CurrentDataBank	s=Resources/DataBank/CMPRD/CurrentDataBank
└	CNDC	s=Resources/DataBank/CNDC
└	Name	s=Resources/DataBank/CNDC/Name
└	NameFormat	s=Resources/DataBank/CNDC/NameFormat
└	CurrentDataBank	s=Resources/DataBank/CNDC/CurrentDataBank
└	EXIOD	s=Resources/DataBank/EXIOD
└	Name	s=Resources/DataBank/EXIOD/Name
└	NameFormat	s=Resources/DataBank/EXIOD/NameFormat
└	CurrentDataBank	s=Resources/DataBank/EXIOD/CurrentDataBank
└	FNPRD	s=Resources/DataBank/FNPRD
└	Name	s=Resources/DataBank/FNPRD/Name
└	NameFormat	s=Resources/DataBank/FNPRD/NameFormat
└	CurrentDataBank	s=Resources/DataBank/FNPRD/CurrentDataBank
└	GMMC	s=Resources/DataBank/GMMC
└	Name	s=Resources/DataBank/GMMC/Name
└	NameFormat	s=Resources/DataBank/GMMC/NameFormat
└	CurrentDataBank	s=Resources/DataBank/GMMC/CurrentDataBank
└	MCRN	s=Resources/DataBank/MCRN
└	Name	s=Resources/DataBank/MCRN/Name
└	NameFormat	s=Resources/DataBank/MCRN/NameFormat
└	CurrentDataBank	s=Resources/DataBank/MCRN/CurrentDataBank
└	C500	s=Resources/DataBank/MCRN/C500
└	Value	s=Resources/DataBank/MCRN/C500/Value
└	C501	s=Resources/DataBank/MCRN/C501
└	...	...
└	MCRS	s=Resources/DataBank/MCRS
└	Name	s=Resources/DataBank/MCRS/Name
└	NameFormat	s=Resources/DataBank/MCRS/NameFormat
└	CurrentDataBank	s=Resources/DataBank/MCRS/CurrentDataBank
└	C500	s=Resources/DataBank/MCRS/C500
└	Value	s=Resources/DataBank/MCRS/C500/Value
└	C501	s=Resources/DataBank/MCRS/C501

## Chapter 4 Server Functions

Tree structure	Name	Node ID
...	...	...
MPRD		s=Resources/DataBank/MPRD
Name		s=Resources/DataBank/MPRD/Name
NameFormat		s=Resources/DataBank/MPRD/NameFormat
CurrentDataBank		s=Resources/DataBank/MPRD/CurrentDataBank
M11000000		s=Resources/DataBank/MPRD/M11000000
M11000001		s=Resources/DataBank/MPRD/M11000000/M11000001
...	...	...
M11010000		s=Resources/DataBank/MPRD/M11010000
...	...	...
MSPSD		s=Resources/DataBank/MSPSD
Name		s=Resources/DataBank/MSPSD/Name
NameFormat		s=Resources/DataBank/MSPSD/NameFormat
CurrentDataBank		s=Resources/DataBank/MSPSD/CurrentDataBank
POSN		s=Resources/DataBank/POSN
Name		s=Resources/DataBank/POSN/Name
NameFormat		s=Resources/DataBank/POSN/NameFormat
CurrentDataBank		s=Resources/DataBank/POSN/CurrentDataBank
G054		s=Resources/DataBank/POSN/G054
...	...	...
X001		s=Resources/DataBank/POSN/X001
...	...	...
H001		s=Resources/DataBank/POSN/H001
B001		s=Resources/DataBank/POSN/B001
...	...	...
POSS		s=Resources/DataBank/POSS
Name		s=Resources/DataBank/POSS/Name
NameFormat		s=Resources/DataBank/POSS/NameFormat
CurrentDataBank		s=Resources/DataBank/POSS/CurrentDataBank
G054		s=Resources/DataBank/POSS/G054
...	...	...
X001		s=Resources/DataBank/POSS/X001
...	...	...
H001		s=Resources/DataBank/POSS/H001
B001		s=Resources/DataBank/POSS/B001
...	...	...
TLOAD		s=Resources/DataBank/TLOAD
Name		s=Resources/DataBank/TLOAD/Name

Tree structure	Name	Node ID
- +	NameFormat	s=Resources/DataBank/TLOAD/NameFormat
- -	CurrentDataBank	s=Resources/DataBank/TLOAD/CurrentDataBank
+ -	TOLC	s=Resources/DataBank/TOLC
- +	Name	s=Resources/DataBank/TOLC/Name
- +	NameFormat	s=Resources/DataBank/TOLC/NameFormat
- -	CurrentDataBank	s=Resources/DataBank/TOLC/CurrentDataBank
+ -	TOLN	s=Resources/DataBank/TOLN
- +	Name	s=Resources/DataBank/TOLN/Name
- +	NameFormat	s=Resources/DataBank/TOLN/NameFormat
- -	CurrentDataBank	s=Resources/DataBank/TOLN/CurrentDataBank
+ -	T001	s=Resources/DataBank/TOLN/T001
- +	L90_X	s=Resources/DataBank/TOLN/T001/L90_X
- +	L90_Y	s=Resources/DataBank/TOLN/T001/L90_Y
- +	L90_Z	s=Resources/DataBank/TOLN/T001/L90_Z
- +	L90_R	s=Resources/DataBank/TOLN/T001/L90_R
- +	L91_X	s=Resources/DataBank/TOLN/T001/L91_X
- +	L91_Y	s=Resources/DataBank/TOLN/T001/L91_Y
- +	L91_Z	s=Resources/DataBank/TOLN/T001/L91_Z
- +	L91_R	s=Resources/DataBank/TOLN/T001/L91_R
- +	L97_Q	s=Resources/DataBank/TOLN/T001/L97_Q
- +	L97_R	s=Resources/DataBank/TOLN/T001/L97_R
- +	L97_W	s=Resources/DataBank/TOLN/T001/L97_W
- +	L97_V	s=Resources/DataBank/TOLN/T001/L97_V
- -	...	...
+ -	V001	s=Resources/DataBank/TOLN/V001
- +	ToolNo1	s=Resources/DataBank/TOLN/V001/ToolNo1
- -	...	...
+ -	M001	s=Resources/DataBank/TOLN/M001
- -	...	...
+ -	TOLS	s=Resources/DataBank/TOLS
- +	Name	s=Resources/DataBank/TOLS/Name
- +	NameFormat	s=Resources/DataBank/TOLS/NameFormat
- -	CurrentDataBank	s=Resources/DataBank/TOLS/CurrentDataBank
+ -	T001	s=Resources/DataBank/TOLS/T001
- +	L90_X	s=Resources/DataBank/TOLS/T001/L90_X
- +	L90_Y	s=Resources/DataBank/TOLS/T001/L90_Y
- +	L90_Z	s=Resources/DataBank/TOLS/T001/L90_Z
- +	L90_R	s=Resources/DataBank/TOLS/T001/L90_R



## Node description

Name	Read & write	Data type	Description
CurrentDataBanks	For reading only	String[]	This acquires all current data bank names.
CMPRD	Available	String	This acquires or sets the communication parameter.
CMPRD/Name	Available	String	This acquires or sets the CMPRD node after setting the data name for the name node.
CMPRD/NameFormat	For reading only	String	The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6 Communication data details” for details on the format of the data names.
CMPRD/CurrentDataBank	Available	String	This acquires or sets the current data bank name for the communication parameter.
CNDC	Available	String	This acquires or sets the cutting conditions.
CNDC/Name	Available	String	This acquires or sets the CNDC node after setting the data name for the name node.
CNDC/NameFormat	For reading only	String	The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6 Communication data details” for details on the format of the data names.
CNDC/CurrentDataBank	Available	String	This acquires or sets the current data bank name for the cutting conditions.
EXIOD	Available	String	This acquires or sets the external I/O signals.
EXIOD/Name	Available	String	This acquires or sets the EXIOD node after setting the data name for the name node.
EXIOD/NameFormat	For reading only	String	The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6 Communication data details” for details on the format of the data names.
EXIOD/CurrentDataBank	Available	String	This acquires or sets the current data bank name for the external I/O signals.
FNPRD	Available	String	This acquires or sets the fieldbus network parameter.
FNPRD/Name	Available	String	This acquires or sets the FNPRD node after setting the data name for the name node.
FNPRD/NameFormat	For reading only	String	The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6 Communication data details” for details on the format of the data names.
FNPRD/CurrentDataBank	Available	String	This acquires or sets the current data bank name for the fieldbus network parameter.
GMMC	Available	String	This acquires or sets the G and M code macros (NC language).
GMMC/Name	Available	String	This acquires or sets the GMMC node after setting the data name for the name node.
GMMC/NameFormat	For reading only	String	The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6 Communication data details” for details on the format of the data names.
GMMC/CurrentDataBank	Available	String	This acquires or sets the current data bank name for the G and M code macros (NC language).
MCRN	Available	String	This acquires or sets the macro variables (type 1) (NC language).
MCRN/Name	Available	String	This acquires or sets the MCRN node after setting the data name for the name node.
MCRN/NameFormat	For reading only	String	The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6.4 File format” for details on the macro variable (Type 1) (NC) format. Refer to “3.6 Communication data details” for details on the format of the data names.
MCRN/CurrentDataBank	Available	String	This acquires or sets the current data bank name for the macro variables (type 1) (NC language).

## Chapter 4 Server Functions

Name	Read & write	Data type	Description
MCRN/C*** (***=500~999)	Available	String	This acquires or sets the macro variables (type 1) (NC language) for the specified symbol. This applies to the macro variables (Type 1) (NC) for the data names set to the MCRN/Name node.
MCRN/C***/Value (***=500~999)	Available	String	This acquires or sets the specified macro variable (type 1) (NC language). This applies to current data banks and macro variables (NC) for the minimum unit settings, regardless of the MCRN/Name node value.
MCRS	Available	String	This acquires or sets the macro variables (type 2) (NC language).
MCRS/Name	Available	String	
MCRS/NameFormat	For reading only	String	This acquires or sets the MCRS node after setting the data name for the name node. The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6.4 File format” for details on the macro variable (Type 2) (NC) format. Refer to “3.6 Communication data details” for details on the format of the data names.
MCRS/CurrentDataBank	Available	String	This acquires or sets the current data bank name for the macro variables (type 2) (NC language).
MCRS/C*** (***=500~999)	Available	String	This acquires or sets the macro variables (type 1) (NC language) for the specified symbol. This applies to the macro variables (Type 2) (NC) for the data names set to the MCRS/Name node.
MCRS/C***/Value (***=500~999)	Available	String	This acquires or sets the specified macro variable (type 1) (NC language). This applies to current data banks and macro variables (NC) for the minimum unit settings, regardless of the MCRS/Name node value.
MPRD	Available	String	This acquires or sets the machine parameter.
MPRD/Name	Available	String	
MPRD/NameFormat	For reading only	String	This acquires or sets the MPRD node after setting the data name for the name node. The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6 Communication data details” for details on the format of the data names.
MPRD/CurrentDataBank	Available	String	This acquires or sets the current data bank name for the machine parameter.
M****0000	Available	String	This acquires or sets the machine parameter for the specified symbol. This applies to the machine parameters set to the MPRD/Name node.
MSPSD	Available	String	This acquires or sets the special settings.
MSPSD/Name	Available	String	
MSPSD/NameFormat	For reading only	String	This acquires or sets the MSPSD node after setting the data name for the name node. The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6 Communication data details” for details on the format of the data names.
MSPSD/CurrentDataBank	Available	String	This acquires or sets the current data bank name for the special settings.

Name	Read & write	Data type	Description
POSN	Available	String	This acquires or sets the workpiece coordinate zero (type 1) (NC language).
POSN/Name	Available	String	This acquires or sets the POSN node after setting the data name for the name node.
POSN/NameFormat	For reading only	String	The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6.4 File format” for details on the workpiece coordinate zero (Type 1) (NC) format. Refer to “3.6 Communication data details” for details on the format of the data names.
POSN/CurrentDataBase	Available	String	This acquires or sets the current data bank name for the workpiece coordinate zero (type 1) (NC language).
POSN/G*** (***=054~059)	Available	String	This acquires or sets the workpiece coordinate zero (type 1) (NC language) for the specified symbol. G***: Workpiece coordinates
POSN/X*** (***=001~300)	Available	String	X***: For extended workpiece coordinates
POSN/H001	Available	String	H***: External workpiece coordinates
POSN/B*** (***=001~008)	Available	String	B***: Reference rotary fixture offset This applies to the workpiece coordinate zero (Type 1) (NC) set to the POSN/Name node.
POSS	Available	String	This acquires or sets the workpiece coordinate zero (type 2) (NC language).
POSS/Name	Available	String	This acquires or sets the POSS node after setting the data name for the name node.
POSS/NameFormat	For reading only	String	The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6.4 File format” for details on the workpiece coordinate zero (Type 2) (NC) format. Refer to “3.6 Communication data details” for details on the format of the data names.
POSS/CurrentDataBase	Available	String	This acquires or sets the current data bank name for the workpiece coordinate zero (type 2) (NC language).
POSS/G*** (***=054~059)	Available	String	This acquires or sets the workpiece coordinate zero (type 2) (NC language) for the specified symbol. G***: Workpiece coordinates
POSS/X*** (***=001~300)	Available	String	X***: For extended workpiece coordinates
POSS/H001	Available	String	H***: External workpiece coordinates
POSS/B*** (***=001~008)	Available	String	B***: Reference rotary fixture offset This applies to the workpiece coordinate zero (Type 2) (NC) set to the POSS/Name node.
TLOAD	Available	String	This acquires or sets the machining load monitor.
TLOAD/Name	Available	String	This acquires or sets the TLOAD node after setting the data name for the name node.
TLOAD/NameFormat	For reading only	String	The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6.4 File format” for details on the machining load monitoring format. Refer to “3.6 Communication data details” for details on the format of the data names.
TLOAD/CurrentDataBase	Available	String	This acquires or sets the current data bank name for the machining load monitor.
TOLC	Available	String	This acquires or sets the tool list (conversation language).
TOLC/Name	Available	String	This acquires or sets the TOLC node after setting the data name for the name node.
TOLC/NameFormat	For reading only	String	The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6 Communication data details” for details on the format of the data names.
TOLC/CurrentDataBase	Available	String	This acquires or sets the current data bank name for the tool list (conversation language).

## Chapter 4 Server Functions

Name	Read & write	Data type	Description
TOLN	Available	String	This acquires or sets the tool data (type 1) (NC language).
TOLN/Name	Available	String	This acquires or sets the TOLN node after setting the data name for the name node.
TOLN/NameFormat	For reading only	String	The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6.4 File format” for details on the tool data (Type 1) (NC) format. Refer to “3.6 Communication data details” for details on the format of the data names.
TOLN/CurrentDataBase	Available	String	This acquires or sets the current data bank name for the tool data (type 1) (NC language).
TOLN/T*** (***=001~099, 201~299)	Available	String	This acquires or sets the data for the specified tool. T***: Tool data This applies to the tool data (Type 1) (NC) set to the TOLN/Name node.
TOLN/T***/Lxx_y (xx=90,91,97, y=X,Y,Z,R,Q,W,V)	Available	String	This acquires or sets the specified machine parameter. L90_X: Tool position offset (X) L90_Y: Tool position offset (Y) L90_Z: Tool length offset L90_R: Cutter compensation L91_X: Tool position wear offset (X) L91_Y: Tool position wear offset (Y) L91_Z: Tool length offset (Z) L91_R: Cutter wear offset L97_Q: Tool life monitoring L97_R: Tool life L97_W: Life warning L97_V: Initial life / End-of-life This applies to current data banks and tool data (NC) for the minimum unit settings, regardless of the TOLN/Name node value.
TOLN/V*** (***=001~030)	Available	String	This acquires or sets the tool data (type 1) (NC language) for the specified symbol. V***: Tool group This applies to the tool data (Type 1) (NC) set to the TOLN/Name node.
TOLN/V***/ToolNoxx (xx=01~30)	Available	String	This acquires or sets the tool in the specified tool order for the specified tool group. (NOTE 1) If a tool is specified at a position in the tool order that is already registered, then the tool position that is already registered is shifted down in the order. (NOTE 2) If there is an open position in the tool order, then all the tools shift up to fill that position. (NOTE 3) If a null character is set to the value, the registered tool is deleted from the tool group. The tools after those deleted in the tool order shift up to fill the deleted position(s). This applies to current data banks and tool data (NC) for the minimum unit settings, regardless of the TOLN/Name node value.
TOLN/M*** (***=001~099, 201~299)	Available	String	This acquires or sets the tool data (type 1) (NC language) for the specified symbol. M***: Tool data range This applies to the tool data (Type 1) (NC) set to the TOLN/Name node.

Name	Read & write	Data type	Description
TOLS	Available	String	This acquires or sets the tool data (type 2) (NC language).
TOLS/Name	Available	String	This acquires or sets the TOLS node after setting the data name for the name node.
TOLS/NameFormat	For reading only	String	The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6.4 File format” for details on the tool data (Type 2) (NC) format. Refer to “3.6 Communication data details” for details on the format of the data names.
TOLS/CurrentDataBase	Available	String	This acquires or sets the current data bank name for the tool data (type 2) (NC language).
TOLS/T***	Available	String	This acquires or sets the tool data (type 2) (NC language) for the specified symbol. T***: Tool data This applies to the tool data (Type 2) (NC) set to the TOLS/Name node.
TOLS/T***/L**_*	Available	String	This acquires or sets the specified machine parameter. L90_X: Tool position offset (X) L90_Y: Tool position offset (Y) L90_Z: Tool length offset L90_R: Cutter compensation L91_X: Tool position wear offset (X) L91_Y: Tool position wear offset (Y) L91_Z: Tool length offset (Z) L91_R: Cutter wear offset L97_Q: Tool life monitoring L97_R: Tool life L97_W: Life warning L97_V: Initial life / End-of-life This applies to current data banks and tool data (NC) for the minimum unit settings, regardless of the TOLS/Name node value.
TOLS/V***	Available	String	This acquires or sets the tool data (type 2) (NC language) for the specified symbol. V***: Tool group This applies to the tool data (Type 2) (NC) set to the TOLS/Name node.
TOLS/V***/ToolNo**	Available	String	This acquires or sets the tool in the specified tool order for the specified tool group. (NOTE 1) If a tool is specified at a position in the tool order that is already registered, then the tool position that is already registered is shifted down in the order. (NOTE 2) If there is an open position in the tool order, then all the tools shift up to fill that position. (NOTE 3) If a null character is set to the value, the registered tool is deleted from the tool group. The tools after those deleted in the tool order shift up to fill the deleted position(s). This applies to current data banks and tool data (NC) for the minimum unit settings, regardless of the TOLS/Name node value.
TOLS/M***	Available	String	This acquires or sets the tool data (type 2) (NC language) for the specified symbol. M***: Tool data range This applies to the tool data (Type 2) (NC) set to the TOLS/Name node.

## Chapter 4 Server Functions

Name	Read & write	Data type	Description
TPTNC	Available	String	This acquires or sets the tool pattern (conversation language).
TPTNC/Name	Available	String	This acquires or sets the communication parameter.
TPTNC/NameFormat	For reading only	String	This acquires or sets the TPTNC node after setting the data name for the name node. The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6 Communication data details” for details on the format of the data names.
TPTNC/CurrentDataBase	Available	String	This acquires or sets the current data bank name for the tool pattern (conversation language).
TPUC	Available	String	This acquires or sets the tapping drill diameter (conversation language).
TPUC/Name	Available	String	This acquires or sets the TPUC node after setting the data name for the name node. The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6 Communication data details” for details on the format of the data names.
TPUC/NameFormat	For reading only	String	This acquires or sets the current data bank name for the tapping drill diameter (conversation language).
UPRD	Available	String	This acquires or sets the user parameter.
UPRD/Name	Available	String	This acquires or sets the communication parameter.
UPRD/NameFormat	For reading only	String	This acquires or sets the UPRD node after setting the data name for the name node. The name format node can acquire the format for the data name that is set for the name node. Refer to “3.6 Communication data details” for details on the format of the data names.
UPRD/CurrentDataBase	Available	String	This acquires or sets the current data bank name for the user parameter.
U****00	Available	String	This acquires or sets the user parameter for the specified symbol. This applies to the user parameters set to the UPRD/Name node.

### 4.2.3.10 Directory node

Tree structure	Name	Node ID
Directory	Directory	s=Resources/Directory
Path	Path	s=Resources/Directory/Path
CreateFolder	CreateFolder	s=Resources/Directory/CreateFolder
InputArguments	InputArguments	s=Resources/Directory/CreateFolder/InputArguments
DeleteFile	DeleteFile	s=Resources/Directory/DeleteFile
InputArguments	InputArguments	s=Resources/Directory/DeleteFile/InputArguments
DeleteFolder	DeleteFolder	s=Resources/Directory/DeleteFolder
InputArguments	InputArguments	s=Resources/Directory/DeleteFolder/InputArguments
DeleteAllProgram	DeleteAllProgram	s=Resources/Directory/DeleteAllProgram
File	File	s=Resources/Directory/File
Name	Name	s=Resources/Directory/File/Name
BinaryValue	BinaryValue	s=Resources/Directory/File/BinaryValue
Value	Value	s=Resources/Directory/File/Value
Files	Files	s=Resources/Directory/Files
Name	Name	s=Resources/Directory/Files/Name
Folders	Folders	s=Resources/Directory/Folders
Name	Name	s=Resources/Directory/Folders/Name
Programs	Programs	s=Resources/Directory/Programs
Name	Name	s=Resources/Directory/Programs/Name

#### Node description

Name	Read & write	Data type	Description
Path	Available	String	This acquires or sets the current folder. The root folder is expressed by a slash ( / ) and a folder (one level higher in the directory) is expressed by two periods ( .. ).
CreateFolder	-	Function	This creates a folder for the current folder.
CreateFolder/ InputArguments	Available	String	This executes the create folder node after setting the folder name to the input arguments node.
DeleteFile	-	Function	This deletes a file in the current folder.
DeleteFile/ InputArguments	Available	String	This executes the delete node after setting the file name to the input arguments node.
DeleteFoder	-	Function	This deletes a folder in the current folder.
DeleteFoder/ InputArguments	Available	String	This executes the delete node after setting the folder name to the input arguments node.
DeleteAllProgram	-	Function	This deletes all NC language programs, conversation language machining data and schedule programs.
File	Not available	-	This is an object node related to the file data.
File/Name	Available	String	This acquires or sets the data for the file in the current folder.
BinaryValue	Available	ByteString	This acquires or sets the value node or binary value node after setting the file name for the name node.
Value	Available	String	
Files	For reading only	String[]	This acquires a list of files in the current folder. This acquires only the information for the specified file after

## Chapter 4 Server Functions

Name	Read & write	Data type	Description
Files/Name	Available	String	<p>setting the file name for the name node.  The format is as follows:  [0][0]: File name for file 1  [0][1]: Size for file 1  [1][0]: File name for file 2  ...</p>
Folders	For reading only	String[]	<p>This acquires a list of folders in the current folder.  This acquires only the information for the specified folder after setting the folder name for the name node.</p>
Folders/Name	Available	String	<p>The format is as follows:  [0]: Folder 1  [1]: Folder 2  ...</p>
Programs	For reading only	String[][]	<p>This acquires a list of programs in the current folder.  This acquires only the information for the specified program after setting the program name for the name node.</p>
Programs/Name	Available	String	<p>The format is as follows:  [0][0]: Data name for program 1  [0][1]: Size for program 1  [0][2]: Comment for program 1  [0][3]: Date for program 1  [1][0]: Data name for program 2  ...  The date format is as follows:  The date is shown as follows from the header: Year (4 digits), month (2 digits), day (2 digits), hour (2 digits), minutes (2 digits), seconds (2 digits).  Ex: December 31, 2020, 23:59:59 → 20201231235959</p>

4

### 4.2.3.11 Memory card node

Tree structure	Name	Node ID
	MemoryCard	s=Resources/MemoryCard
	ManagedData	s=Resources/MemoryCard/ManagedData

#### Node description

Name	Read & write	Data type	Description
ManagedData	For reading only	String[]	<p>This acquires the management data for the memory card.  [0]: Number of registered data  [1]: Number of available data that can be registered  [2]: Memory being used  [3]: Available memory</p>

#### 4.2.4 DiagnosticInfo

When the OPC UA server fails to process the request from the client due to the machine status, the following status code is returned to the client processing request:

BadRequestNotAllowed(0x80E40000).

In this situation, a detailed description of the cause for the failure is set and returned to “additionalInfo” in “DiagnosticInfo”. A two-digit number is set as a character string to “additionalInfo”. The following table provides a description of each two-digit number.

additional Info	Meaning
00	Normally ended
01	Invalid data is received
02	Illegal slave command header
04	Illegal slave command check sum
05	Currently in editing or operation mode, so processing is not possible The folder is currently in use; cannot delete.
06	Editing error occurred during file operation.
07	The specified data does not exist. Current or specified folder does not exist.
08	Slave command data name is incorrect. The specified folder name is abnormal.
09	The specified data cannot be saved or deleted.
10	Data protection enabled
11	Remote operation not permitted
13	The item of the received data is not within the allowed range or the number of items doesn't match. A symbol in the receiving data does not follow the record order in the file.
14	Data version error
15	During special startup
16	Cannot read the specified data.
17	Output of drawing data was attempted during drawing.
18	The folder already exists when creating the folder. The folder exists when deleting the folder; cannot delete.
19	Designation of data size is abnormal. Size of binary data is abnormal.
20	Binary data storage error.
21	Auto notification function reserve 1
22	Auto notification function reserve 2
23	Access is restricted
30	The specified program does not exist due to a change in the selected program. When changing the data bank, the specified number is not within the allowed range. When changing the data bank, the specified number is not a data bank. Changing the data bank is attempted while data protection is enabled. When changing the ATC tool, the specified number is not within the allowed range. An illegal signal name was specified via external input/output signal operation. The value is outside the specified range when writing individual data. Illegal signal name is designated in PLC signal operation.
31	An attempt was made to change the selected program while in another mode (not memory operation mode). When changing the data bank, the machine parameter number was changed. Changing the data bank was attempted in a mode other than program edit mode. When changing the ATC tool, the specified tool is already registered. A signal that cannot be updated is specified for updating via external input/output signal operation. Write target is wrong in individual data writing. Attempted to update signals that cannot be updated in PLC signal setting.

additional Info	Meaning
32	An attempt was made to change the selected program during operation or editing. An attempt was made to change the selected program while tape operation is selected. Changing the data bank was attempted during operation or editing. When changing the ATC tool, an attempt was made to set a large tool to a pot with a tool attached to the adjacent pot. Character strings other than ON/OFF were specified via external input/output signal operation. Attempted to set a value that cannot be set in PLC signal setting.
33	When changing the ATC tool, the tool is not registered in the specified group. A signal that cannot be turned off was attempted to be turned off via external input/output signal operation.
34	When changing the ATC tool, changing a magazine item (group/main tool/ drawing color) without a tool number assigned was attempted.
35	When changing the ATC tool, the pot adjacent to the specified pot contains a large tool.
36	Changing the ATC tool was attempted during memory operation.
37	Changing the ATC tool was attempted during MDI operation.
38	Unspecified error occurred during ATC tool change.
39	When changing the ATC tool, registering the unregistered tool in the tool list was attempted.
40	Conflict occurred due to communication using other port.
41	Check sum error occurred in the specified data.
42	Parity error occurred in the specified data.
43	The specified data is too large to be stored.
44	The specified data cannot be stored because programs #8000 to #8999 are write-protected.
45	Machine unit system is different.
46	The tool that is unable to change group/main tool/tool type/drawing color in ATC tool change is set.
60	Mode change not permitted
61	Mode change not permitted signal is on.
62	MDI operation mode
63	During tool change
64	During automatic centering
65	During automatic workpiece measurement
66	Automatic door operation not possible
67	Operation not possible
68	No program
69	Not in memory operation mode (or edit-during-operation mode)
70	The outer door is open.
71	The door is open.
72	The side door is open.
73	Resetting
74	Servo control is on.
75	<b>[FEED HOLD]</b> switch is held down.
76	Zero return was not conducted.
77	Restarting program Sequence search in progress
78	Pallet position error
79	Performing tool breakage detection
80	Program number error Different from pallet program
81	Outer pallet A and B-axes operating
82	No quick table
83	<PALLET> key is set to OFF.
84	Workpiece counter end
85	Executing external output command
86	Memory operation mode

<b>additional Info</b>	<b>Meaning</b>
87	External input not available
88	In handle mode
89	XY-axes lock signal is on.
90	Z-axis lock signal is on.
91	*-axis lock signal is on.
92	Pot is not at the top end.
93	Zero return command error
94	Indexing not permitted signal is on.
95	Pallet start reversed
96	Outer pallet operating
97	Communicating
98	NC or conversation mode is not selected correctly.
99	Reservation