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OPC UA umati Interface WinNC

gültig für folgende Steuerungen:
EMCO WinNC for Sinumerik Operate T und M ab Version 1.20.0002
EMCO WinNC for Fanuc31i T und M ab Version 1.16.0002
EMCO WinNC for Heidenhain TNC640 ab Version 1.14.0002

valid for following controls:
EMCO WinNC for Sinumerik Operate T and M from version 1.20.0002
EMCO WinNC for Fanuc31i T and M from version 1.16.0002
EMCO WinNC for Heidenhain TNC640 from version 1.14.0002

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Schnittstellenbeschreibung OPC UA umati Interface WinNC

Das OPC UA umati Interface WinNC ist ein umati-kompatibler OPC UA-Server zur Netzwerkanbindung einer Concept Maschine an externe Systeme. Maschinendaten können über diese Schnittstelle ausgelesen werden.
Zusätzlich ist die Steuerung der Maschine über Kommandos möglich, und steuerungsspezifische Parameter können gesetzt werden.
Dieses Interface kann mit den folgenden CNC-Steuerungstypen betrieben werden:

- EMCO WinNC for Sinumerik Operate T und M ab Version 1.20.0002
- EMCO WinNC for Fanuc31i T und M ab Version 1.16.0002
- EMCO WinNC for Heidenhain TNC640 ab Version 1.14.0002

Der Server besteht aus den folgenden beiden Diensten:
- EMCO Opcua Backend WinNC Service
- EMCO Opcua Frontend Service

Das Backend wurde als Verbindung zwischen den Steuerungen und dem Frontend OPC UA Server entwickelt, der das Mapping zwischen der Anfrage des Frontend Services via HTTP auf eine spezielle Variablenabfrage oder auf ein Kommando für die jeweilige WinNC-Steuerung übernimmt.

Grundlegende Dokumentation zu umati und OPC UA ist unter https://documentation.unified-automation.com und Machine Tools - Monitoring and Job Overview (opcfoundation.org) zu finden.

Der Server basiert auf der Companion Specification der OPC Foundation
OPC 40501-1: Machine Tools - Monitoring and Job Overview mit *MachineTool Basic Server Profile* mit folgenden Facets:
- MachineTool Monitoring Server Facet
- MachineTool Tools Server Facet
- MachineTool Errors and Alerts Server Facet

Facet: “Profile dedicated to a specific feature that a Server or Client may require”

Jedoch wurde für die Anforderungen, auch Variablen schreiben bzw. Kommandos ausführen zu können, der BaseObjectType *MachineToolType* auf *EMCOMachineToolType* erweitert. Darin wurden auch zusätzliche Variablen definiert, die im umati-Umfang nicht enthalten sind, aber als Rückmeldung auf Kommandos gelesen werden müssen.

Der **MachineToolType** umfasst alle relevanten Informationen zu einer Werkzeugmaschine und strukturiert die Schnittstelle folgendermaßen in folgende obligatorische Komponenten:

- **Identification** (MachineToolIdentificationType)
- **Monitoring** (MonitoringType) -> ChannelMonitoringType
- **Notification** (NotificationType)
- **Production** (ProductionType):
  Unter Production -> ActiveProgram wurde der *ProductionActiveProgramType* als *EmcoProductionActiveProgramType* um die Variable ActProgLine erweitert.
- Equipment -> Tools (ToolListType) -> Tool (ToolType)

Der **EMCOMachineToolType** enthält zusätzlich noch die Knoten:

- **PeripheralDevices** mit den Variablen ClampingDeviceState und DoorState, die den Status des Spannmittels bzw. der Tür abbilden
- **UserParameter:**
  Für jede WinNC-Steuerung gibt es unter Machines.MachineTool1.UserParameter je 10 Variable, die von einem OPC UA Client geschrieben werden können:
  n=0..9: Machines.MachineTool1.UserParameter*n (double),* Machines.MachineTool1.StringParameter*n*

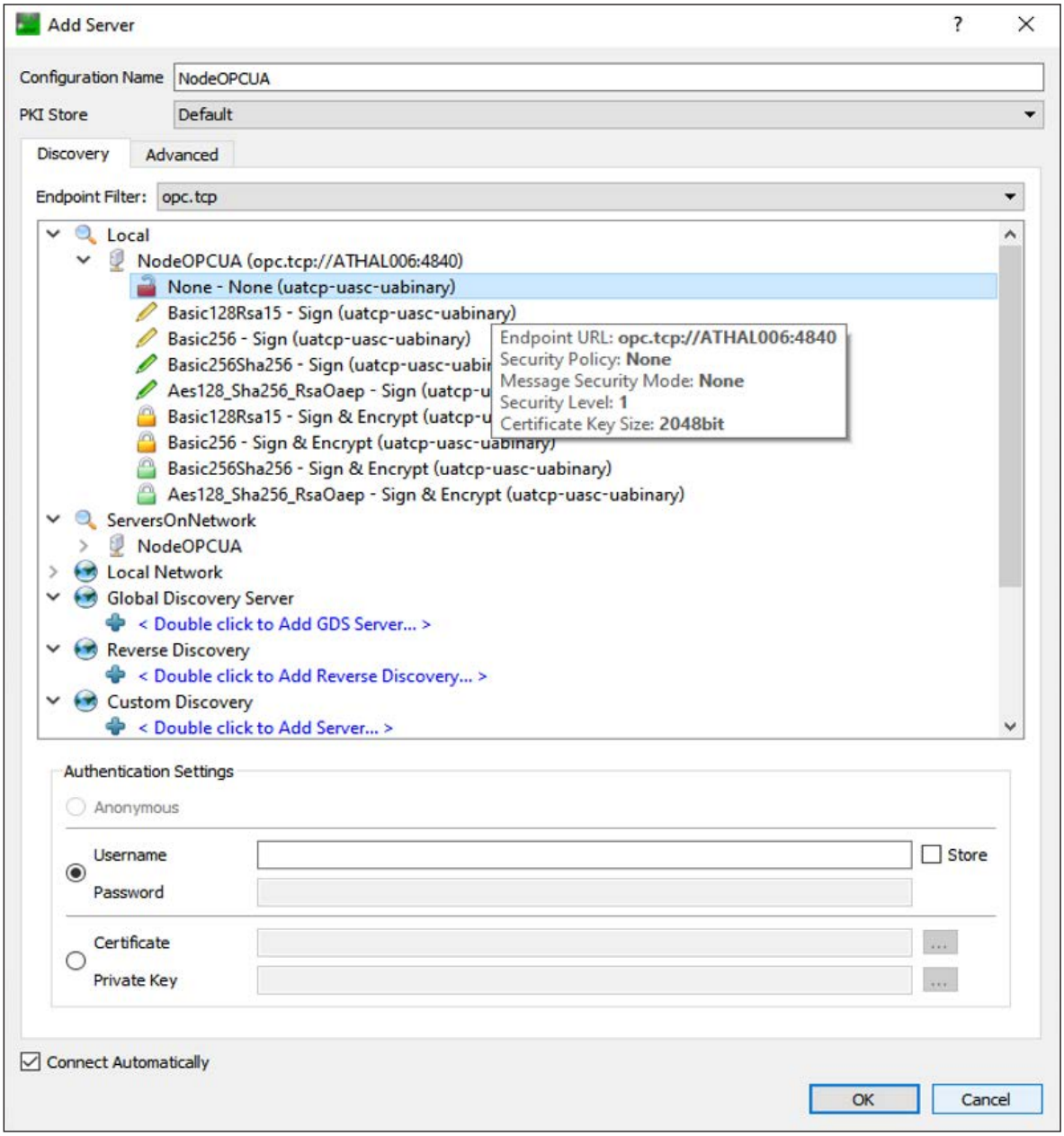
WinNC	Double-Parameter	String-Parameter
Sinumerik Operate	R0 - R9 (R-Parameter)	_TXT[0] -_TXT[9]
Heidenhain TNC640	Q50 - Q59 (Q-Parameter)	QS0 - QS9 (QS-Parameter)
Fanuc 31i	#500 - #509 (Kunden-Makro)	nicht vorhanden

- ControlCommands mit den Kommandos an die Steuerung:
  Folgende Kommandos sind als UAMethods mit einem Argument und einem Rückgabewert implementiert. Das Ergebnis besagt, ob das Kommando erfolgreich an die Steuerung gesendet werden konnte.
  Um zu überprüfen, ob das Kommando auch erfolgreich abgearbeitet wurde, können die passenden Variablen unter Machines.MachineTool1... gelesen werden.

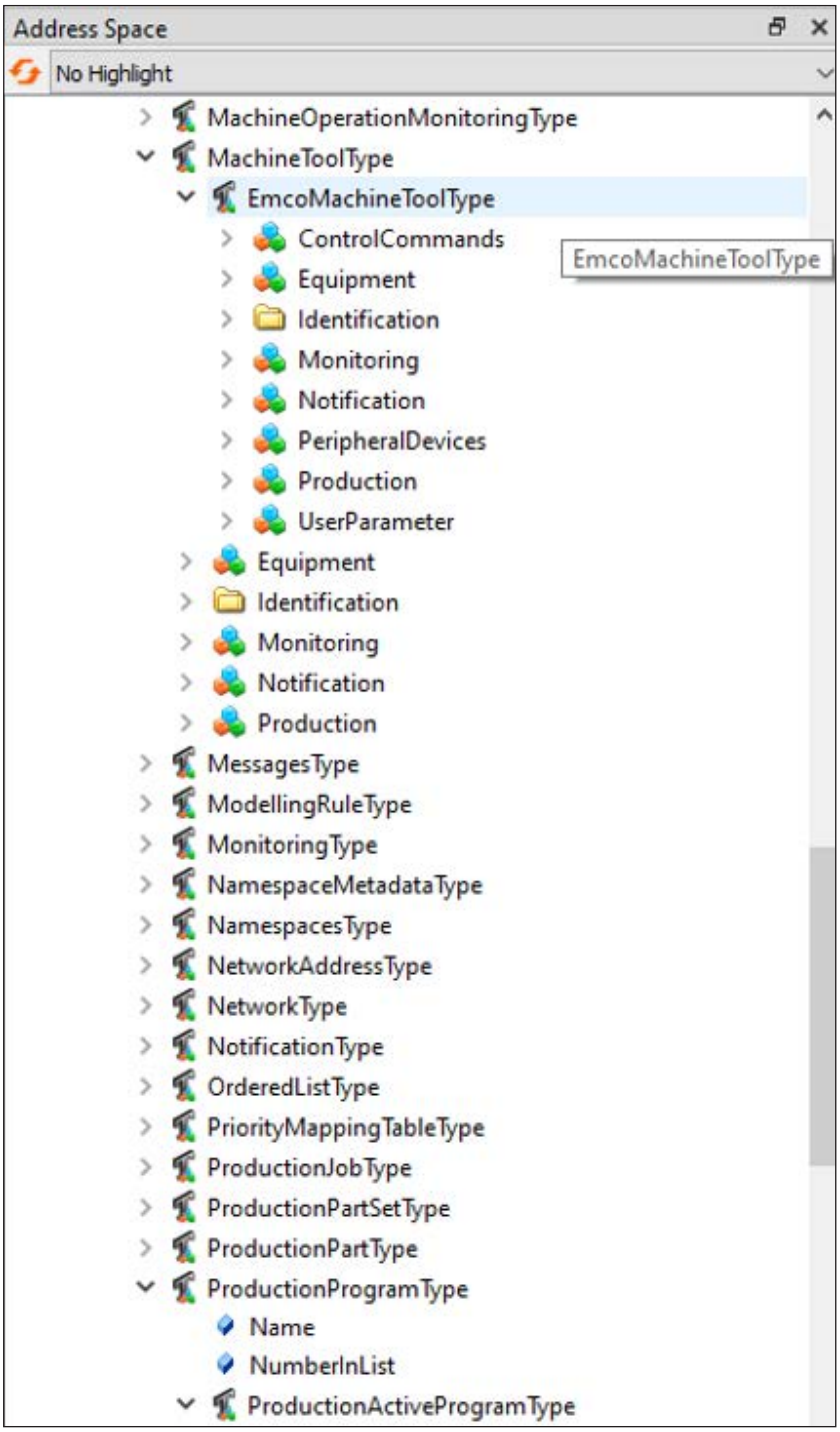
Kommando	Argument	Variable zur Prüfung
Clamping (Spannmittel)	0 (öffnen) 1 (schließen)	PeripheralDevices.ClampingDeviceState
Door (Maschinentür)	0 (öffnen) 1 (schließen) 2 (stopp)	PeripheralDevices.DoorState
OperationMode (Betriebsart wechseln auf)	0 (Automatic) 1 (MdaMdi) 2 (JogManual) 3 (JogIncrement) 6 (Reference)	Monitoring.Channel1.ChannelMode
Reference (Achsen referenzieren)	-1 (alle Linear- und Rundachsen), Bitmaske für einzelne Achsen, z.B. 5 für X/Z	Monitoring.Channel1.Axis*n*.Referenced
ProgramStart (Programm starten)	1 (Start)	Monitoring.Channel1.ChannelState = 0 (Active)
ProgramStop (Programm anhalten)	1 (Stopp)	Monitoring.Channel1.ChannelState = 1 (Interrupted)
Reset (Reset ausführen)	1 (Reset)	Monitoring.Channel1.ChannelState = 2 (Reset)
SelectProgram	kompletter Pfad oder relativ zum NCFilePath der Steuerung z.B. C:/WinNC32/hmioperate.m/prg/MPF.DIR/TEST.MPF	Monitoring.Channel1.SelectedProgram
SetFeedOverride (Feed Override setzen)	Integerwert von 0 bis 120 (Prozentangabe)	Monitoring.Channel1.FeedOverride
SetSpeedOverride (Speed Override setzen)	Integerwert von 50 bis 120 (Prozentangabe)	Monitoring.Spindle1.Override
Tool (Werkzeug einwechseln)	Werkzeugnummer	Monitoring.Channel1.ActTool

Die folgenden Screenshots veranschaulichen die verfügbaren Variablen und Kommandos mithilfe des freien OPC UA Clients UAExpert.

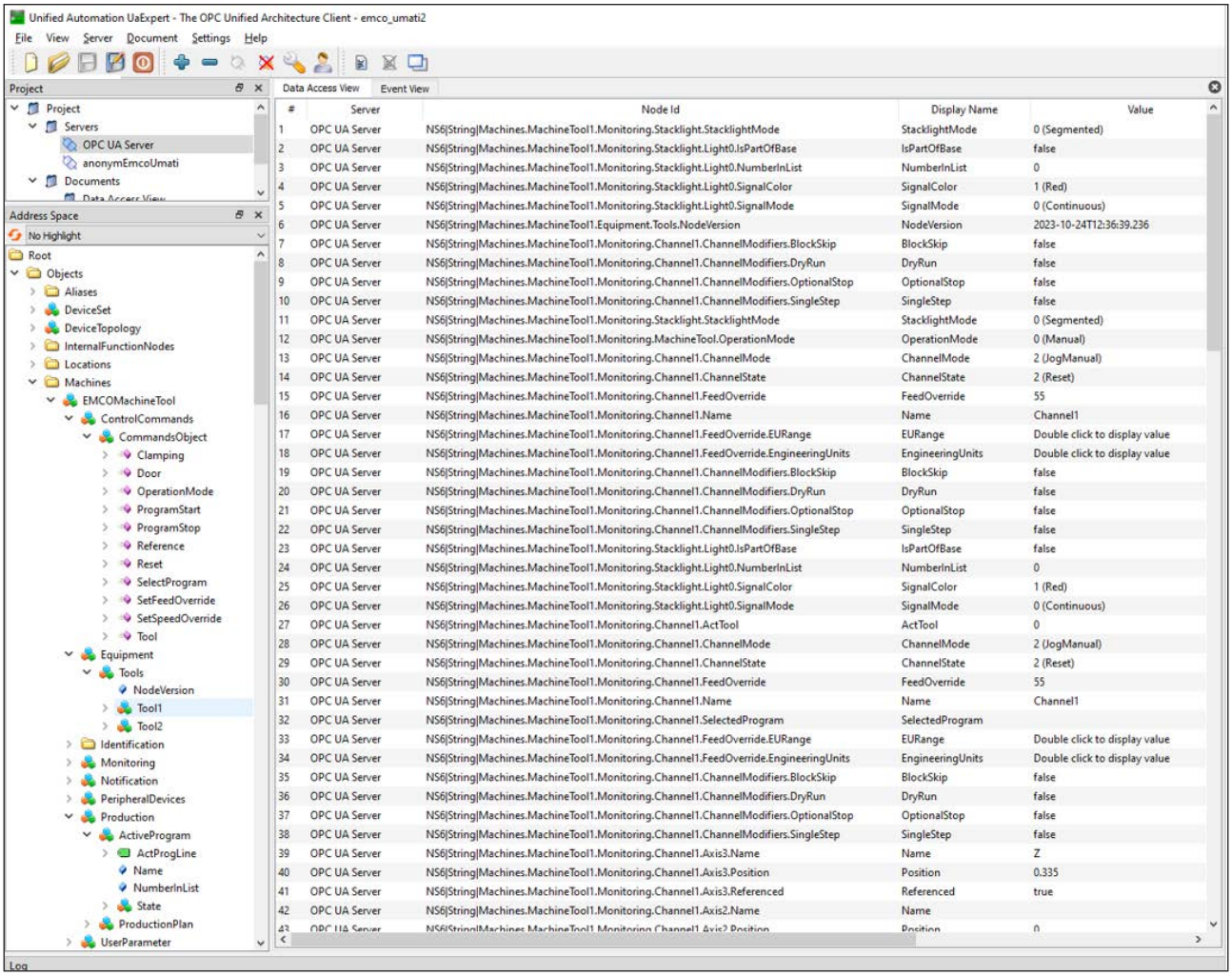
Der OPC UA-Server kann entweder mit reinem Lesezugriff anonym oder mit den Zugangsdaten
user: admin, password: pw1
verbunden werden.



Im Address Space im UAExpert können die Typdefinitionen angezeigt werden:

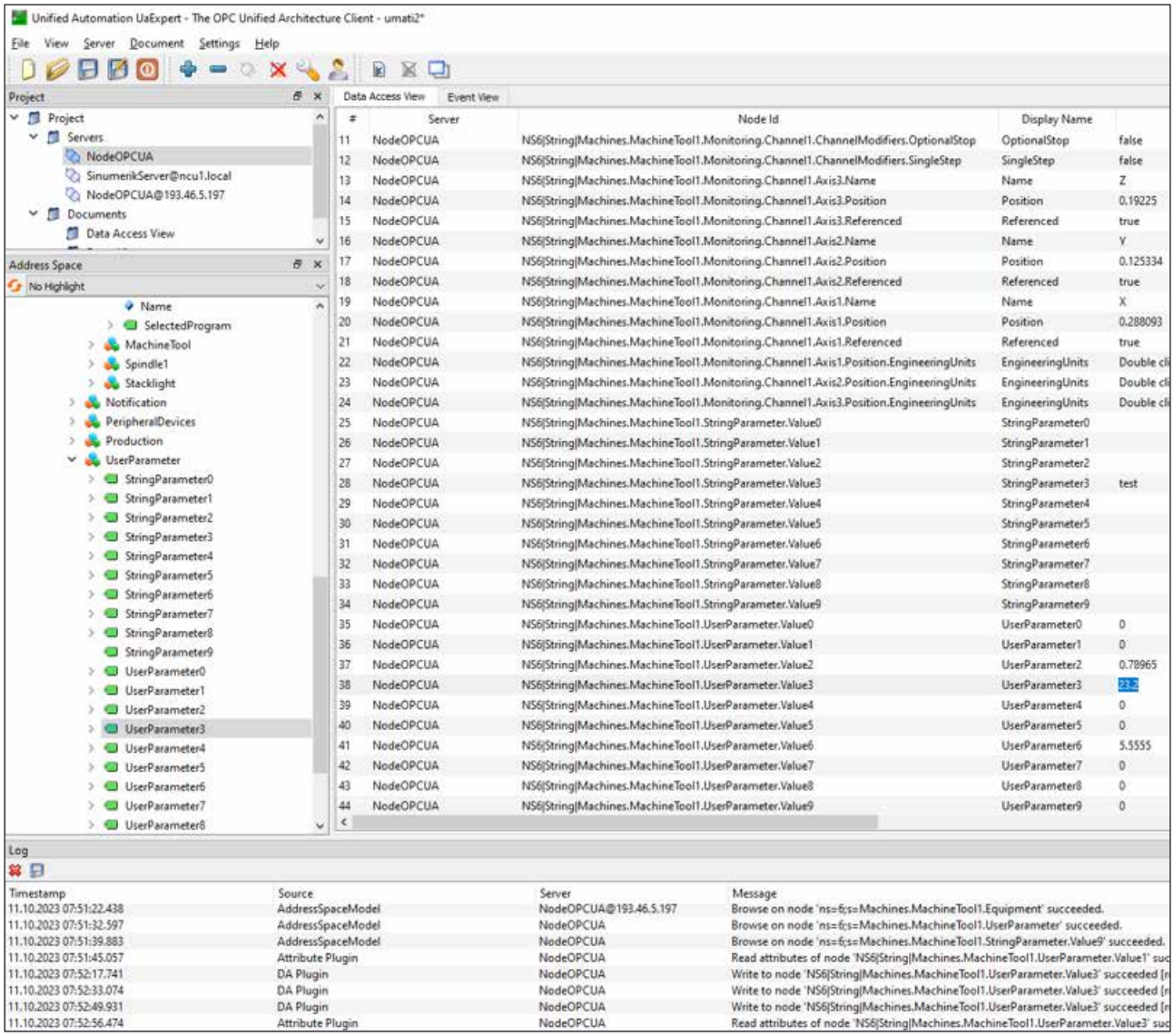


Im Address Space unter Root->Objects->Machines finden sich die oben beschriebenen Kommandos und Variablen. Die Knoten-IDs und Werte der Variablen lassen sich im Data Access View durch Verschieben in diesen Bereich anzeigen.

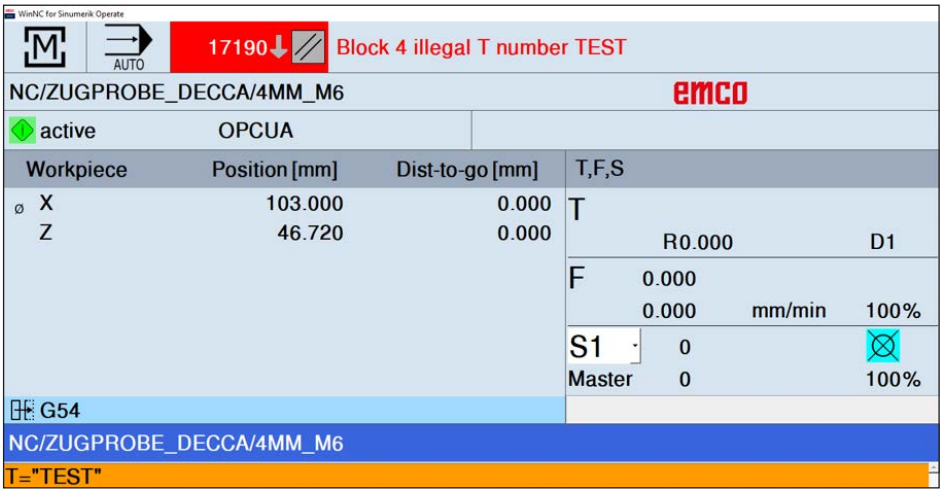


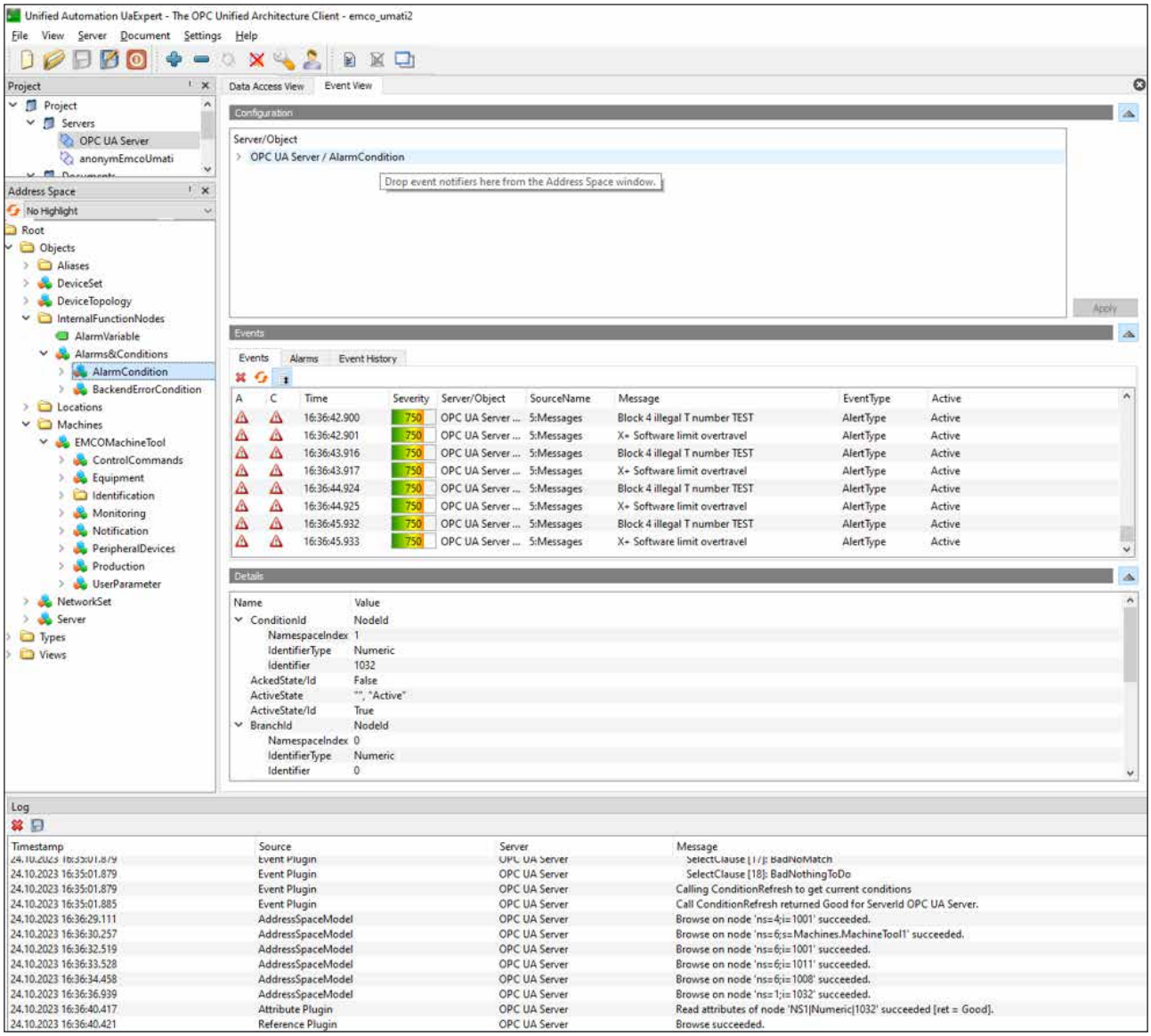
#	Server	Node Id	Display Name	Value
1	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.StacklightMode	StacklightMode	0 (Segmented)
2	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.Light0.IsPartOfBase	IsPartOfBase	false
3	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.Light0.NumberInList	NumberInList	0
4	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.Light0.SignalColor	SignalColor	1 (Red)
5	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.Light0.SignalMode	SignalMode	0 (Continuous)
6	OPC UA Server	NS6|String|Machines.MachineTool1.Equipment.Tools.NodeVersion	NodeVersion	2023-10-24T12:36:39.236
7	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.BlockSkip	BlockSkip	false
8	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.DryRun	DryRun	false
9	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.OptionalStop	OptionalStop	false
10	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.SingleStep	SingleStep	false
11	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.StacklightMode	StacklightMode	0 (Segmented)
12	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.MachineTool.OperationMode	OperationMode	0 (Manual)
13	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelMode	ChannelMode	2 (JogManual)
14	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelState	ChannelState	2 (Reset)
15	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.FeedOverride	FeedOverride	55
16	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.Name	Name	Channel1
17	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.FeedOverride.EURange	EURange	Double click to display value
18	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.FeedOverride.EngineeringUnits	EngineeringUnits	Double click to display value
19	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.BlockSkip	BlockSkip	false
20	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.DryRun	DryRun	false
21	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.OptionalStop	OptionalStop	false
22	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.SingleStep	SingleStep	false
23	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.Light0.IsPartOfBase	IsPartOfBase	false
24	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.Light0.NumberInList	NumberInList	0
25	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.Light0.SignalColor	SignalColor	1 (Red)
26	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.Light0.SignalMode	SignalMode	0 (Continuous)
27	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ActTool	ActTool	0
28	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelMode	ChannelMode	2 (JogManual)
29	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelState	ChannelState	2 (Reset)
30	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.FeedOverride	FeedOverride	55
31	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.Name	Name	Channel1
32	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.SelectedProgram	SelectedProgram	
33	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.FeedOverride.EURange	EURange	Double click to display value
34	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.FeedOverride.EngineeringUnits	EngineeringUnits	Double click to display value
35	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.BlockSkip	BlockSkip	false
36	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.DryRun	DryRun	false
37	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.OptionalStop	OptionalStop	false
38	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.SingleStep	SingleStep	false
39	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.Axis3.Name	Name	Z
40	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.Axis3.Position	Position	0.335
41	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.Axis3.Referenced	Referenced	true
42	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.Axis2.Name	Name	
43	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.Axis2.Position	Position	0

Gesetzt werden kann ein Wert im Data Access View unter Value, wenn die Variable schreibbar ist, ansonsten wird im Log-Fenster ein Fehler ausgegeben.
Nur die UserParameter und StringParameter sind schreibbar.



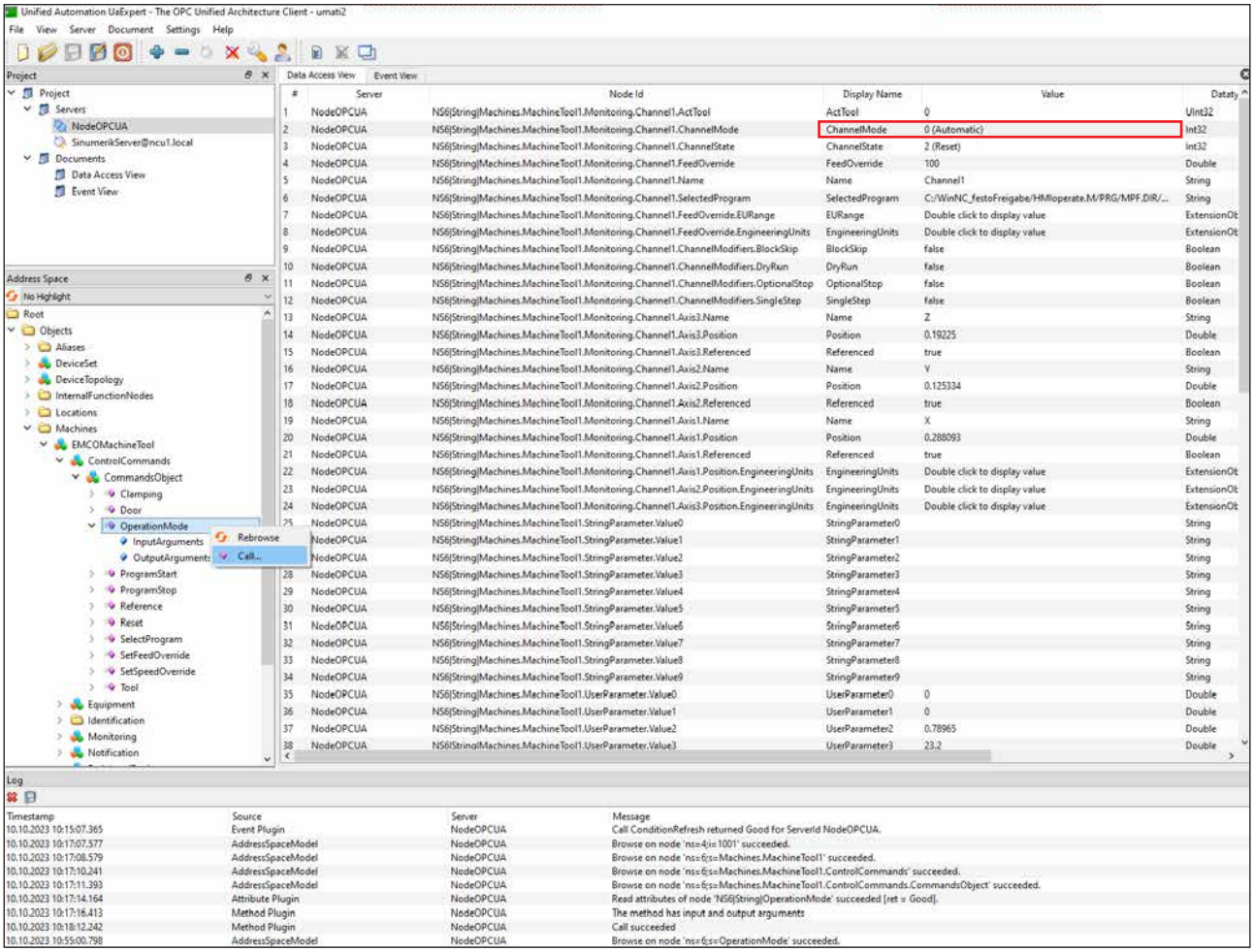
Alarme der Steuerung werden zyklisch gesendet und im EventView des UAExpert angezeigt. Dazu muss unter Configuration der Knoten AlarmCondition hinzugefügt werden.

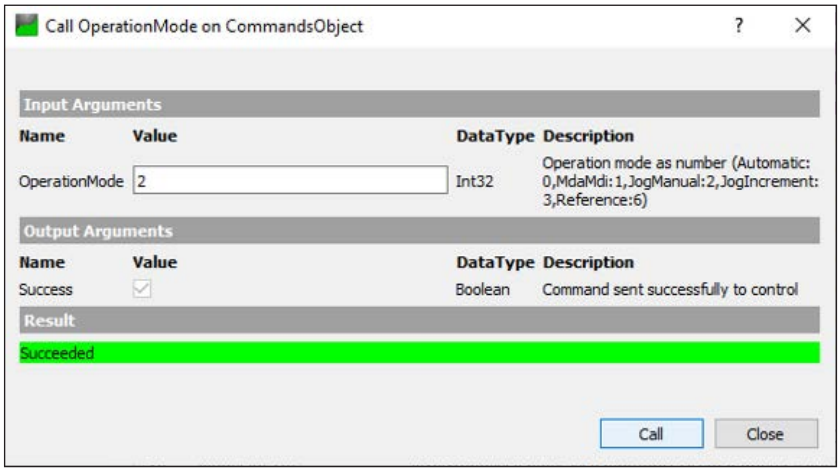




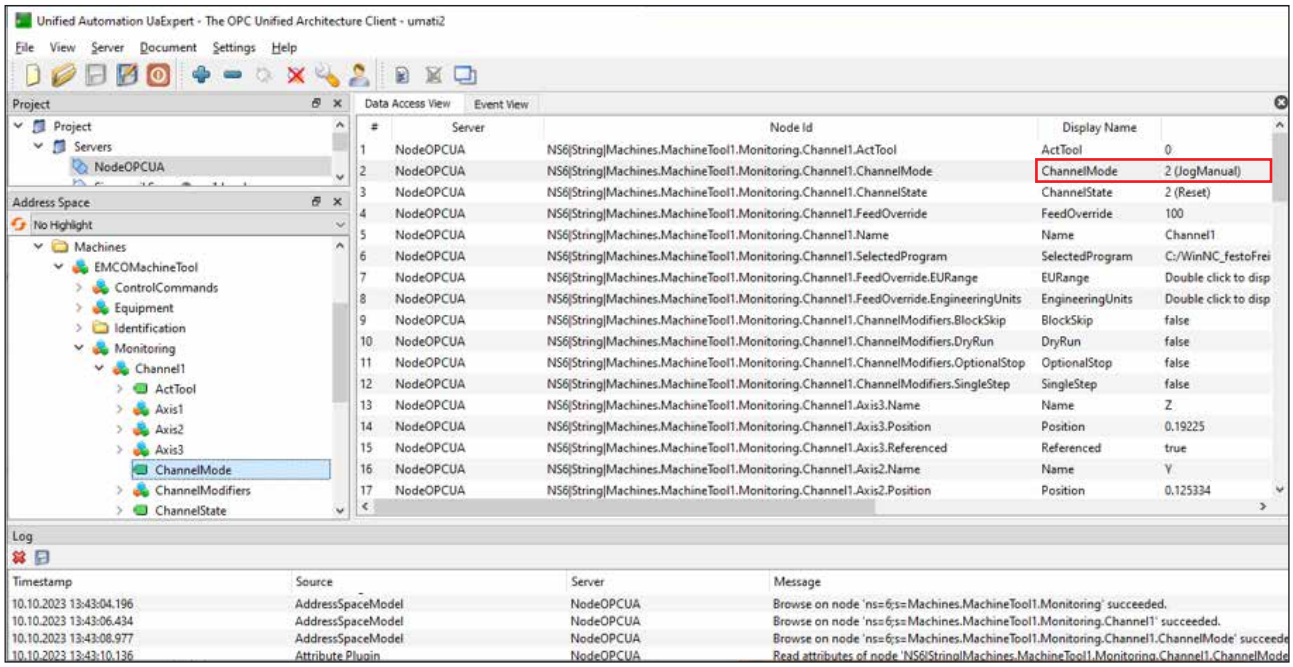
Hier noch ein Beispiel zur Prüfung, ob die Steuerung ein Kommando korrekt umgesetzt hat:

- Aufruf des Kommandos OperationMode mit dem Argument 2 (JogManual):





- Positive Rückmeldung, d.h. das Kommando wurde erfolgreich an die Steuerung versandt.
- Kontrolle unter EMCOMachineTool.Monitoring.Channel1.Channel-Mode, ob das Kommando von der Steuerung ausgeführt wurde.



Dieses Produkt entstand in Kooperation mit dem CDP, Austrian Center for Digital Production GmbH, TU Wien.

Interface description OPC UA umati interface WinNC

The OPC UA umati interface WinNC is an umati-compatible OPC UA server for the network connection of a Concept Machine to external systems. Machine data can be read out via this interface.
In addition, the machine can be controlled via commands and control-specific parameters can be set. This interface can be operated with the following CNC control types:

- EMCO WinNC for Sinumerik Operate T and M from version 1.20.0002
- EMCO WinNC for Fanuc31i T and M from version 1.16.0002
- EMCO WinNC for Heidenhain TNC640 from version 1.14.0002

The server consists of the following two services:
- EMCO Opcua Backend WinNC Service
- EMCO Opcua Frontend Service

The backend was developed as a connection between the controls and the frontend OPC UA server, which takes over the mapping between the request of the frontend service via HTTP to a special variable query or to a command for the respective WinNC control.

Basic documentation on umati and OPC UA can be found at
https://documentation.unified-automation.com and
Machine Tools - Monitoring and Job Overview (opcfoundation.org)

The server is based on the Companion Specification of the OPC Foundation
OPC 40501-1: Machine Tools - Monitoring and Job Overview mit *MachineTool Basic Server Profile* with the following facets:
- MachineTool Monitoring Server Facet
- MachineTool Tools Server Facet
- MachineTool Errors and Alerts Server Facet

Facet: “Profile dedicated to a specific feature that a Server or Client may require”

However, the BaseObjectType MachineToolType was extended to EMCOMachineToolType for the requirements of also being able to write variables or execute commands. This also defines additional variables that are not included in the umati scope but must be read as a response to commands.

The **MachineToolTyp**e includes all relevant information about a machine tool and structures the interface as follows into the following mandatory components

- **Identification** (MachineToolIdentificationType)
- **Monitoring** (MonitoringType) -> ChannelMonitoringType
- **Notification** (NotificationType)
- **Production** (ProductionType):
  Under Production -> ActiveProgram the *ProductionActiveProgramType* has been extended as *EmcoProductionActiveProgramType* by the variable ActProgLine.
- Equipment -> Tools (ToolListType) -> Tool (ToolType)

The **EMCOMachineToolType** also contains the nodes:

- **PeripheralDevices** with the variables ClampingDeviceState and DoorState, which map the status of the clamping device or door
- **UserParameter:**
  There are 10 variables for each WinNC controller under Machines. MachineTool1.UserParameter, which can be written by an OPC UA client:
  n=0..9: Machines.MachineTool1.UserParameter*n (double)*, Machines.MachineTool1.StringParameter*n*

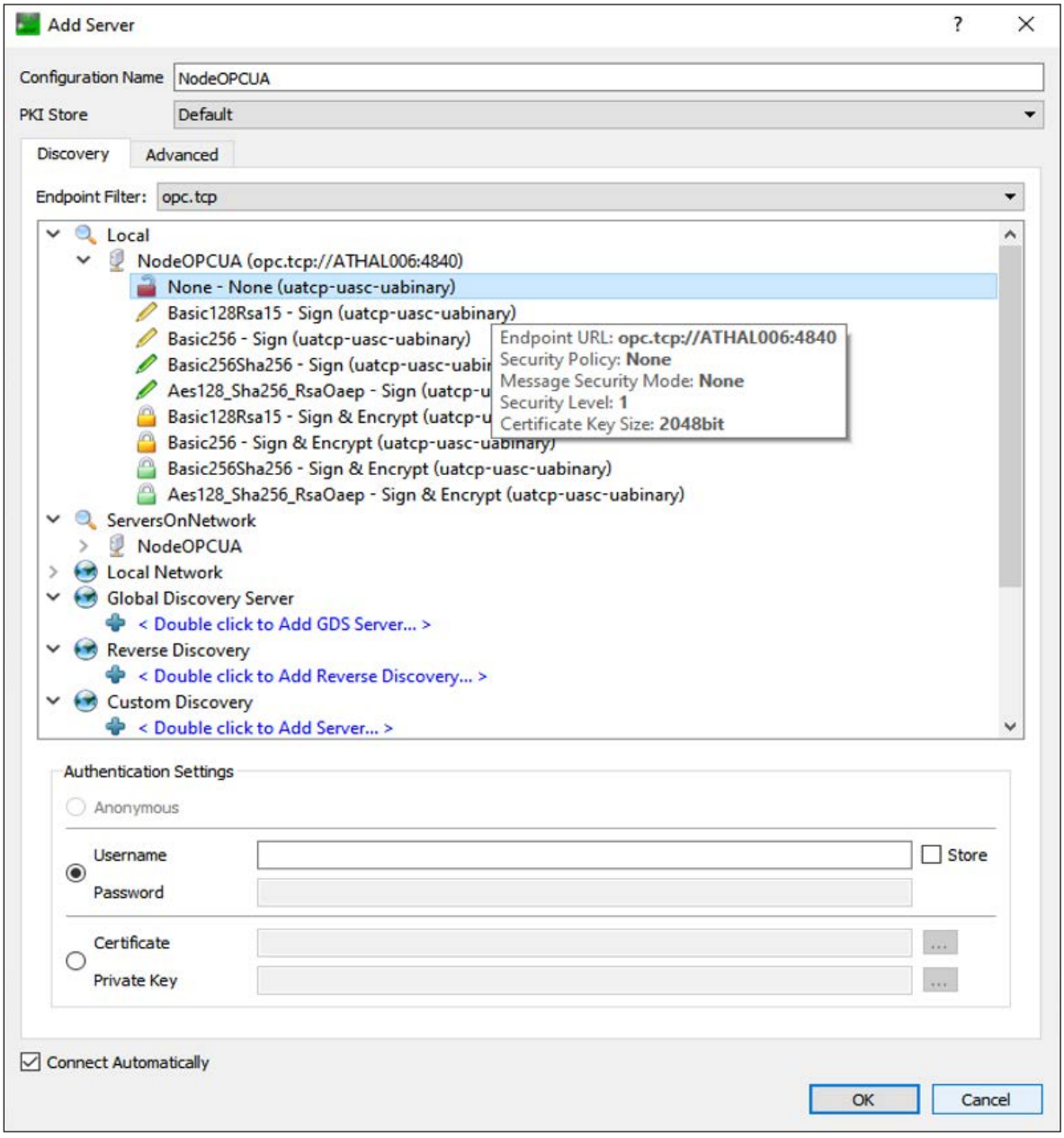
WinNC	Double-parameter	String-parameter
Sinumerik Operate	R0 - R9 (R-parameter)	_TXT[0] -_TXT[9]
Heidenhain TNC640	Q50 - Q59 (Q-parameter)	QS0 - QS9 (QS-Parameter)
Fanuc 31i	#500 - #509 (client-makro)	not available

- ControlCommands with the commands to the controller:
  The following commands are implemented as UAMethods with an argument and a return value. The result indicates whether the command was successfully sent to the controller.
  To check whether the command was also processed successfully, the corresponding variables under Machines.MachineTool1... can be read.

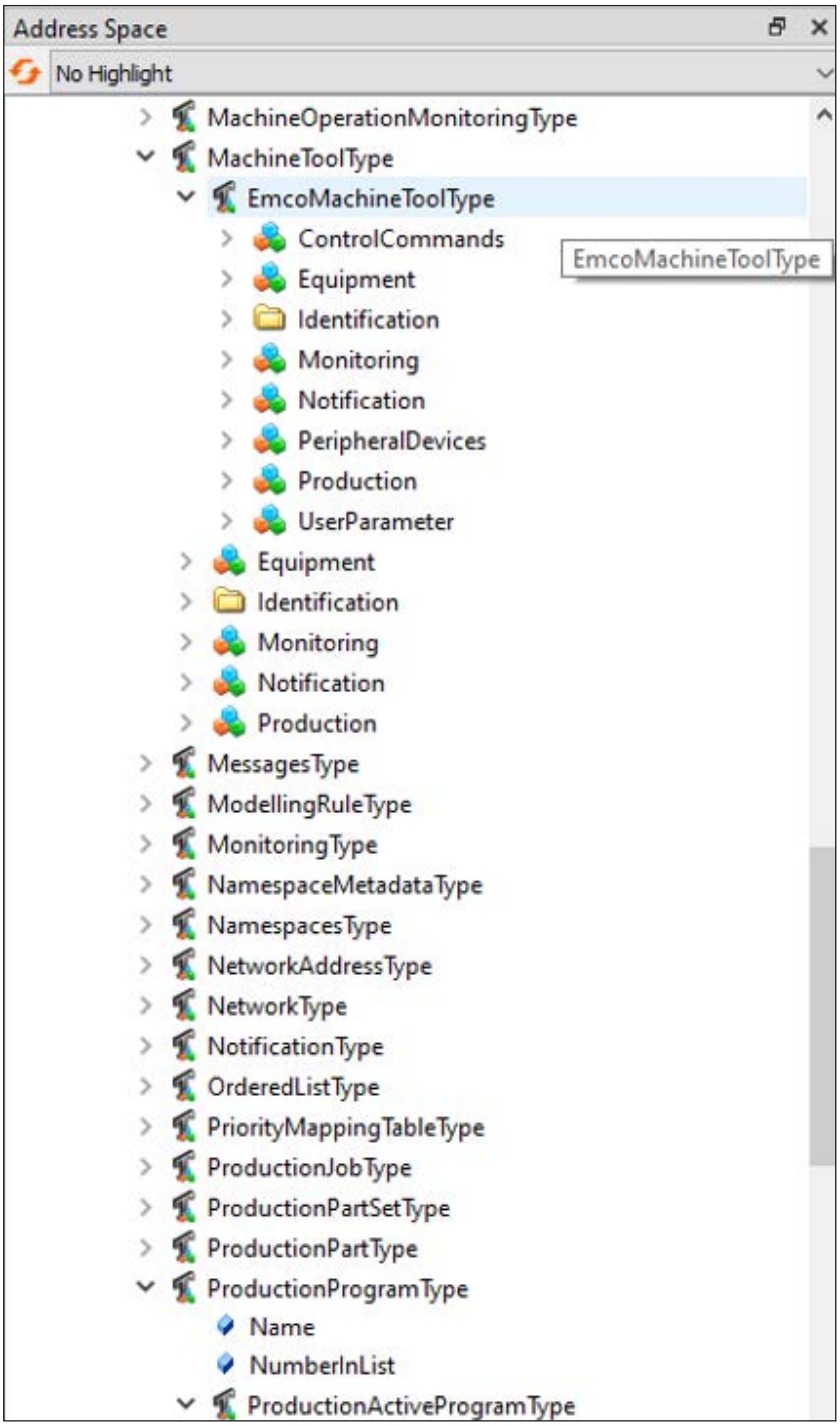
Command	Argument	Variable for testing
Clamping	0 (open) 1 (close)	PeripheralDevices.ClampingDeviceState
Door	0 (open) 1 (close) 2 (stop)	PeripheralDevices.DoorState
OperationMode (Change operation mode)	0 (Automatic) 1 (MdaMdi) 2 (JogManual) 3 (JogIncrement) 6 (Reference)	Monitoring.Channel1.ChannelMode
Reference (reference axes)	-1 (all linear and rotary axes), bit mask for individual axes, e.g. 5 for X/Z	Monitoring.Channel1.Axis*n*.Referenced
ProgramStart	1 (Start)	Monitoring.Channel1.ChannelState = 0 (Active)
ProgramStop	1 (Stop)	Monitoring.Channel1.ChannelState = 1 (Interrupted)
Reset	1 (Reset)	Monitoring.Channel1.ChannelState = 2 (Reset)
SelectProgram	complete path or relative to the NCFilePath of the controller e.g. C:/WinNC32/hmioperate.m/prg/MPF.DIR/TEST.MPF	Monitoring.Channel1.SelectedProgram
SetFeedOverride	Integer value from 0 to 120 (percentage)	Monitoring.Channel1.FeedOverride
SetSpeedOverride	Integer value from 50 to 120 (percentage)	Monitoring.Spindle1.Override
Tool	tool number	Monitoring.Channel1.ActTool

The following screenshots illustrate the available variables and commands using the free OPC UA client UAExpert.

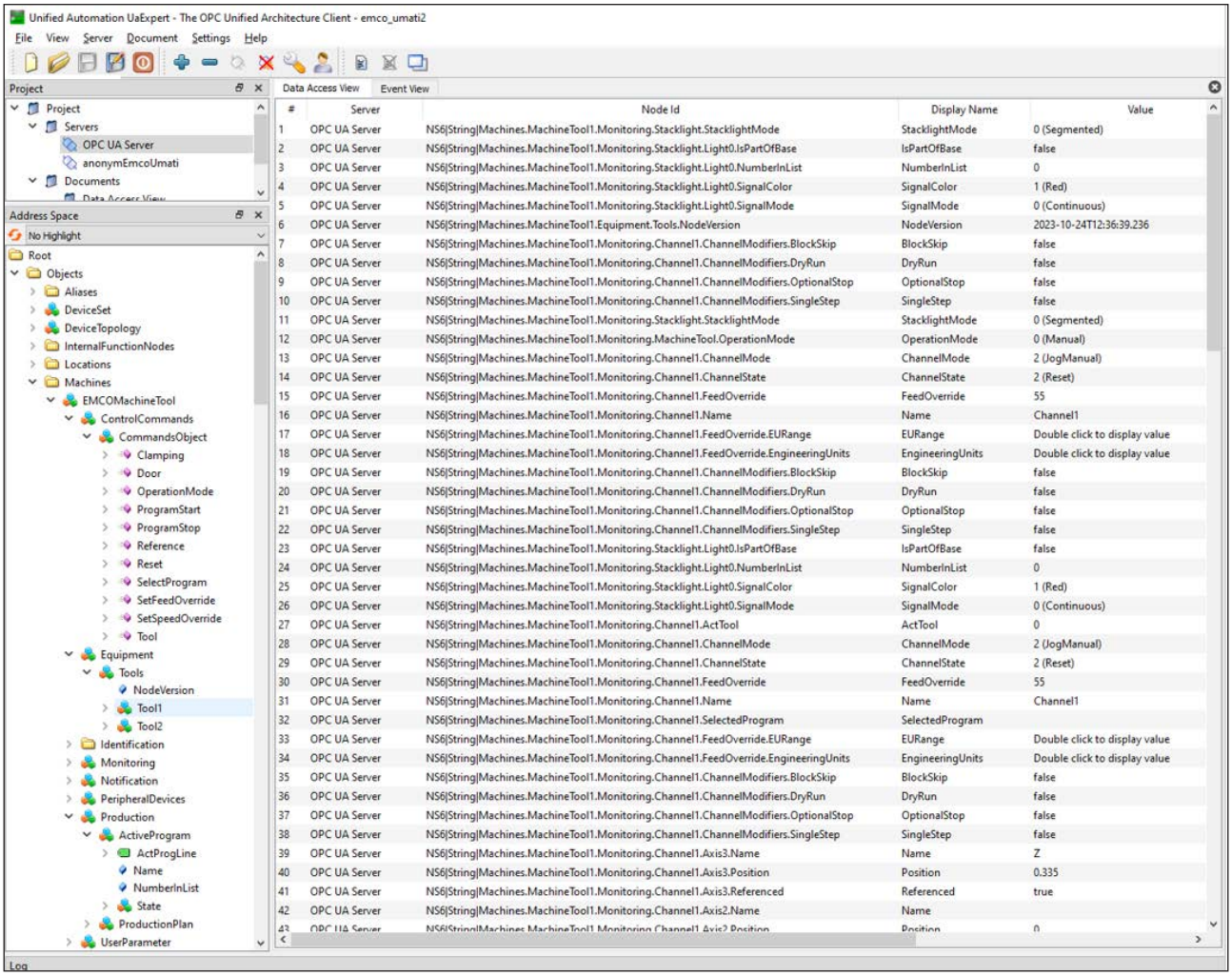
The OPC UA server can be connected either with anonymous read-only access or with the following login credentials:
user: admin, password: pw1



The type definitions can be displayed in the address space in the UAExpert:

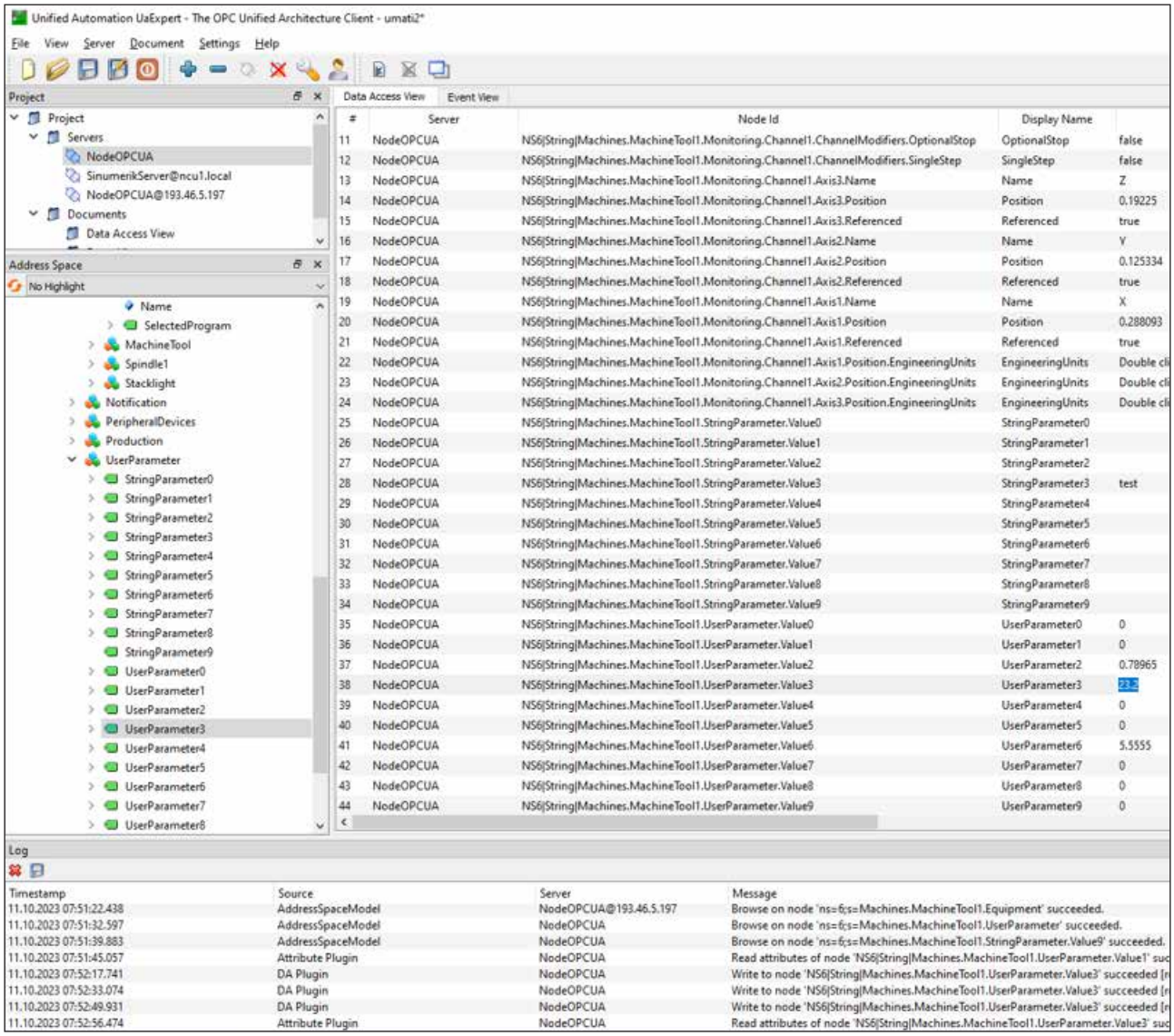


The commands and variables described above can be found in the Address Space under Root->Objects->Machines. The node IDs and values of the variables can be displayed in the Data Access View by moving them to this area.

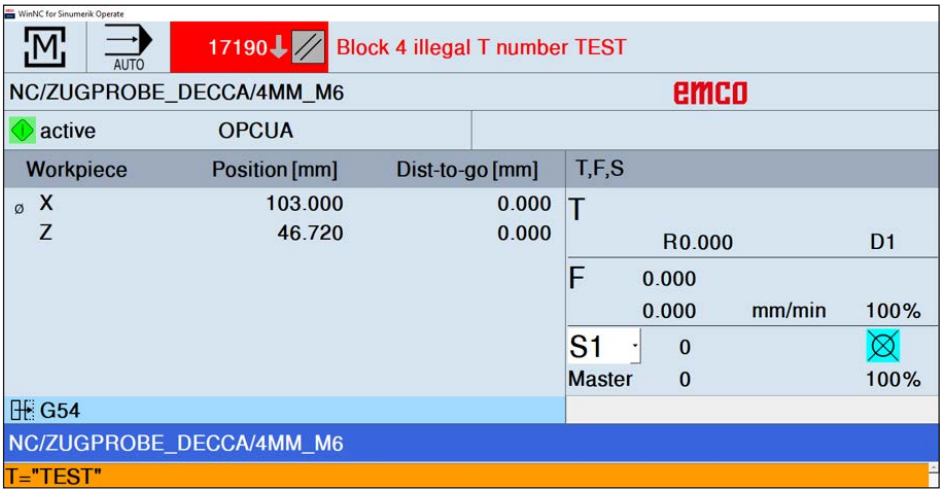


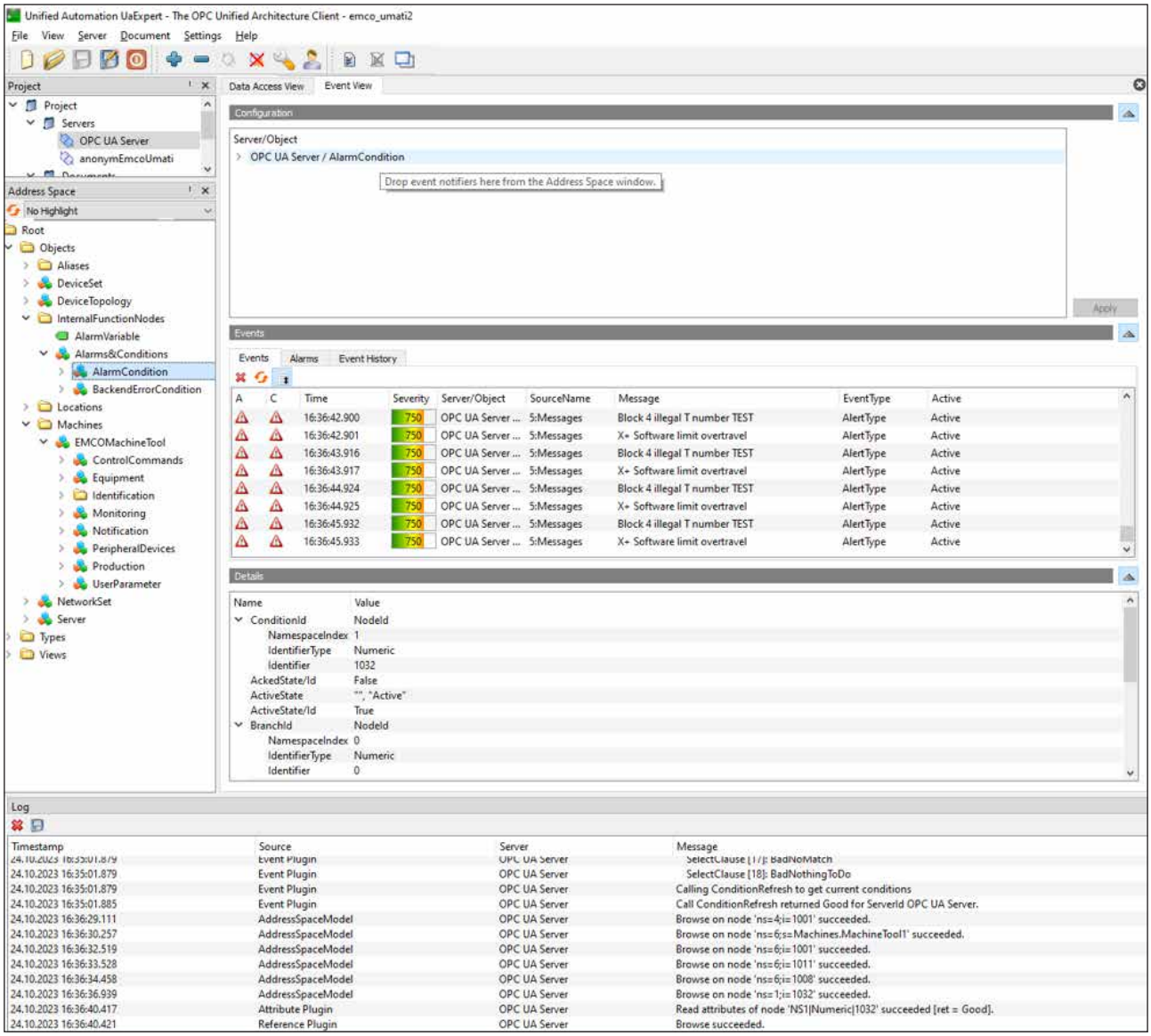
#	Server	Node Id	Display Name	Value
1	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.StacklightMode	StacklightMode	0 (Segmented)
2	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.Light0.IsPartOfBase	IsPartOfBase	false
3	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.Light0.NumberInList	NumberInList	0
4	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.Light0.SignalColor	SignalColor	1 (Red)
5	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.Light0.SignalMode	SignalMode	0 (Continuous)
6	OPC UA Server	NS6|String|Machines.MachineTool1.Equipment.Tools.NodeVersion	NodeVersion	2023-10-24T12:36:39.236
7	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.BlockSkip	BlockSkip	false
8	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.DryRun	DryRun	false
9	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.OptionalStop	OptionalStop	false
10	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.SingleStep	SingleStep	false
11	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.StacklightMode	StacklightMode	0 (Segmented)
12	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.MachineTool.OperationMode	OperationMode	0 (Manual)
13	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelMode	ChannelMode	2 (JogManual)
14	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelState	ChannelState	2 (Reset)
15	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.FeedOverride	FeedOverride	55
16	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.Name	Name	Channel1
17	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.FeedOverride.EURange	EURange	Double click to display value
18	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.FeedOverride.EngineeringUnits	EngineeringUnits	Double click to display value
19	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.BlockSkip	BlockSkip	false
20	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.DryRun	DryRun	false
21	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.OptionalStop	OptionalStop	false
22	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.SingleStep	SingleStep	false
23	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.Light0.IsPartOfBase	IsPartOfBase	false
24	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.Light0.NumberInList	NumberInList	0
25	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.Light0.SignalColor	SignalColor	1 (Red)
26	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Stacklight.Light0.SignalMode	SignalMode	0 (Continuous)
27	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ActTool	ActTool	0
28	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelMode	ChannelMode	2 (JogManual)
29	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelState	ChannelState	2 (Reset)
30	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.FeedOverride	FeedOverride	55
31	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.Name	Name	Channel1
32	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.SelectedProgram	SelectedProgram	
33	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.FeedOverride.EURange	EURange	Double click to display value
34	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.FeedOverride.EngineeringUnits	EngineeringUnits	Double click to display value
35	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.BlockSkip	BlockSkip	false
36	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.DryRun	DryRun	false
37	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.OptionalStop	OptionalStop	false
38	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.ChannelModifiers.SingleStep	SingleStep	false
39	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.Axis3.Name	Name	Z
40	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.Axis3.Position	Position	0.335
41	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.Axis3.Referenced	Referenced	true
42	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.Axis2.Name	Name	
43	OPC UA Server	NS6|String|Machines.MachineTool1.Monitoring.Channel1.Axis2.Position	Position	0

A value can be set in the Data Access View under Value if the variable is writable, otherwise an error is displayed in the log window. Only the UserParameter and StringParameter can be written.



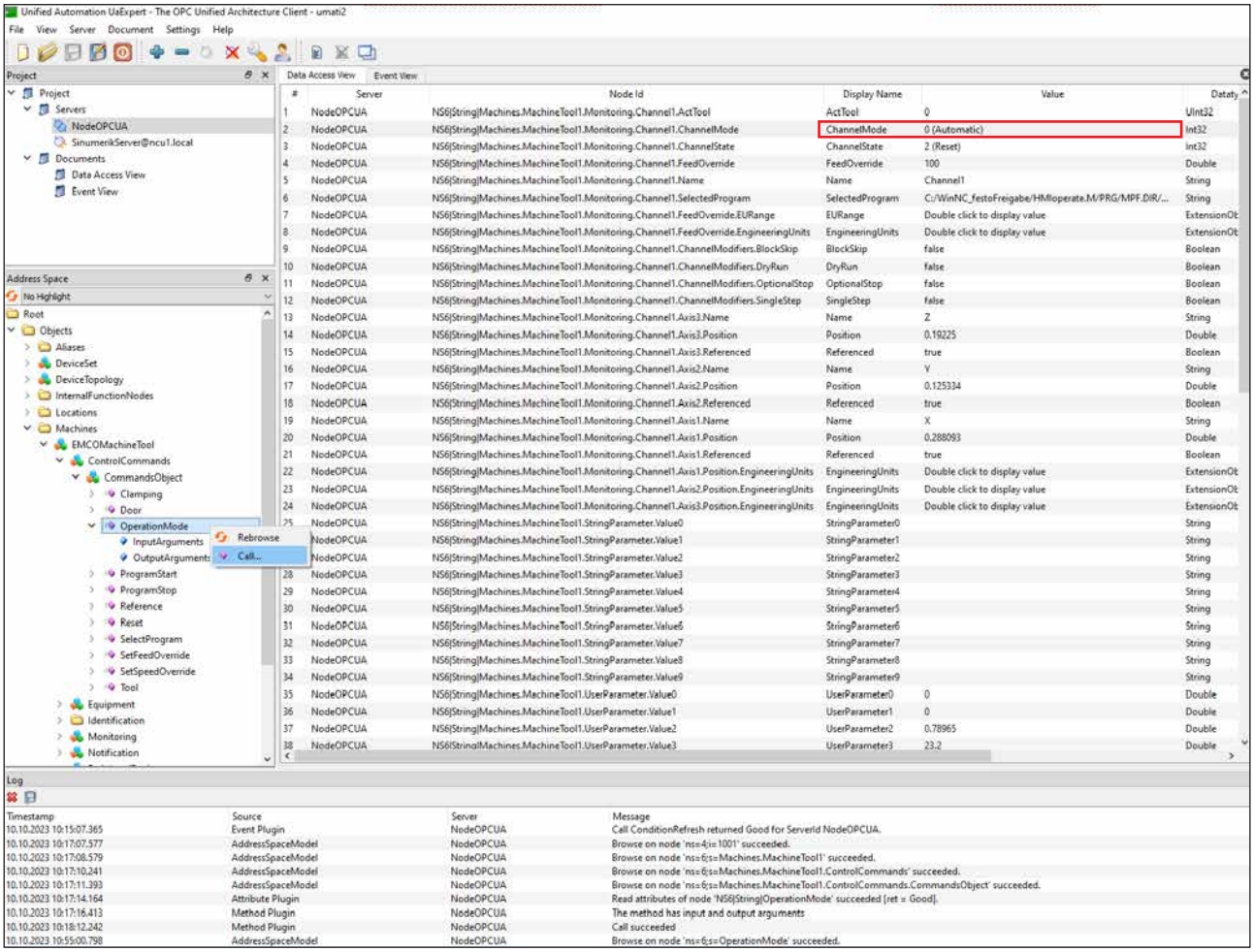
Alarms from the controller are sent cyclically and displayed in the EventView of the UAExpert. To do this, the AlarmCondition node must be added under Configuration.

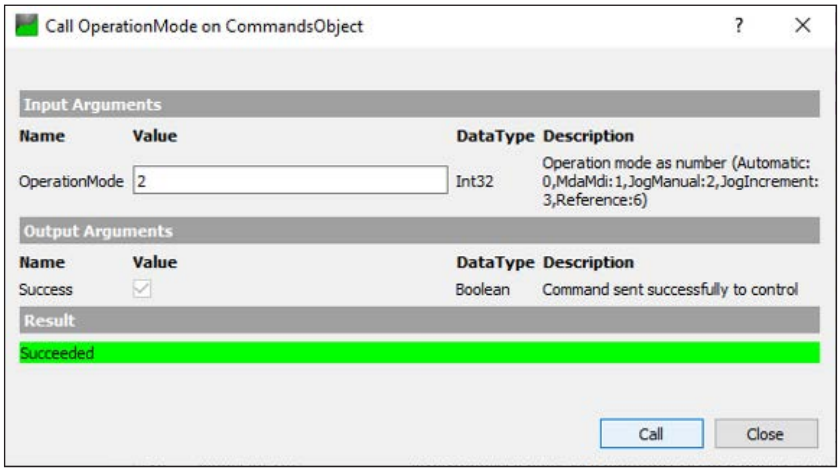




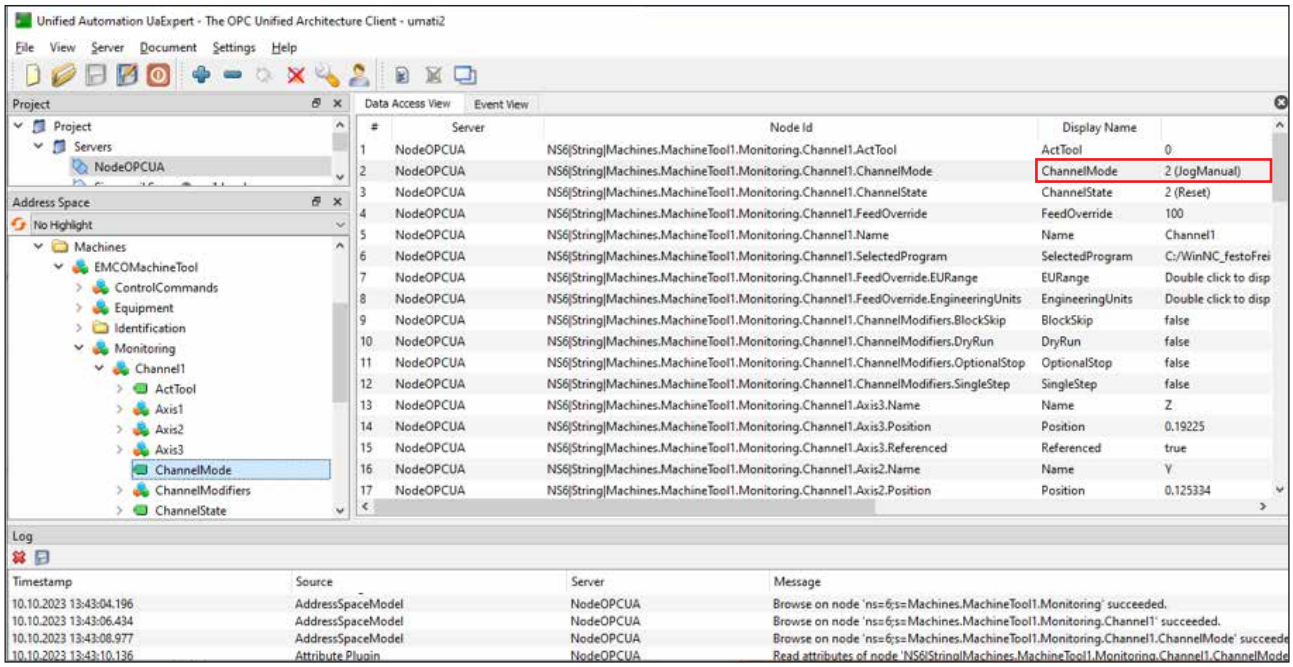
Here is another example to check whether the controller has implemented a command correctly:

- Calling the OperationMode command with the argument 2 (Jog-Manual):





- Positive feedback, i.e. the command was successfully sent to the control unit.
- Check EMCOMachineTool.Monitoring.Channel1.ChannelMode whether the command was executed by the control unit.



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