European Plastics and Rubber Machinery

EUROMAP 82.6	OPC UA interfaces for plastics and rubber machinery - Peripheral devices - Granulate Drying Devices

Release Candidate 1.0.0, 2025-06-01

EUROMAP 82.6 (Release Candidate 1.0.0) is identical with

OPC 40082-6 (Release Candidate 1.0.0) and VDMA 40082-6:2025-06

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Forewords

OPC UA is a machine to machine communication technology to transmit characteristics of products (e.g. manufacturer name, device type or components) and process data (e.g. temperatures, pressures or feed rates). To enable vendor unspecific interoperability the description of product characteristics and process data has to be standardized utilizing technical specifications, the OPC UA companion specifications.

This specification was created by a joint working group of the OPC Foundation and EUROMAP. It is adopted identically as VDMA Specification.

EUROMAP

EUROMAP is the European umbrella association of the plastics and rubber machinery industry which accounts for annual sales of around 13.5 billion euro and a 40 per cent share of worldwide production. Almost 75 per cent of its European output is shipped to worldwide destinations. With global exports of 10.0 billion euro, EUROMAP's around 1,000 machinery manufacturers are market leaders with nearly half of all machines sold being supplied by EUROMAP members.

EUROMAP provides technical recommendations for plastics and rubber machines. In addition to standards for machine descriptions, dimensions and energy measurement, interfaces between machines feature prominently. The provision of manufacturer independent interfaces ensures high levels of machine compatibility.

OPC Foundation

OPC is the interoperability standard for the secure and reliable exchange of data and information in the industrial automation space and in other industries. It is platform independent and ensures the seamless flow of information among devices from multiple vendors. The OPC Foundation is responsible for the development and maintenance of this standard.

OPC UA is a platform independent service-oriented architecture that integrates all the functionality of the individual OPC Classic specifications into one extensible framework. This multi-layered approach accomplishes the original design specification goals of:

- Platform independence: from an embedded microcontroller to cloud-based infrastructure
- Secure: encryption, authentication, authorization and auditing
- Extensible: ability to add new features including transports without affecting existing applications
- Comprehensive information modelling capabilities: for defining any model from simple to complex

1 Scope

OPC 40082-6 describes the interface between plastics and rubber production machines (e.g. injection moulding machines, extruder, blow moulding machines) and granulate drying devices for data exchange via OPC UA. The target of OPC 40082-6 is to provide a unique interface for granulate drying devices and machines from different manufacturers to ensure compatibility.

Intended to have only one client at the time.

The following functionalities are covered:

– General information about the granulate drying device (manufacturer, model, serial number…), current configuration and status.

– Process information like temperatures and air flow for monitoring and process optimization.

– Energy consumption

– Errors and alarm handling

– Remote control by Start / Stop methods

– Login of the machine user on the granulate drying device

– Maintenance activities

Following functions are not included:

– Safety related signals like emergency stop

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments and errata) applies

OPC 10000-1, *OPC Unified Architecture - Part 1: Overview and Concepts*

http://www.opcfoundation.org/UA/Part1/

OPC 10000-3, *OPC Unified Architecture - Part 3: Address Space Model*

http://www.opcfoundation.org/UA/Part3/

OPC 10000-5, *OPC Unified Architecture - Part 5: Information Model*

http://www.opcfoundation.org/UA/Part5/

OPC 10000-6, *OPC Unified Architecture - Part 6: Mappings*

http://www.opcfoundation.org/UA/Part6/

OPC 10000-7, *OPC Unified Architecture - Part 7: Profiles*

http://www.opcfoundation.org/UA/Part9/

OPC 10000-100, *OPC Unified Architecture - Part 100: Devices*

http://www.opcfoundation.org/UA/Part100/

OPC 40001-1, *OPC UA for Machinery - Part 1: Basic Building Blocks*

http://www.opcfoundation.org/UA/Machinery/

OPC 40083: *OPC UA interfaces for plastics and rubber machinery – General Type definitions*

http://www.opcfoundation.org/UA/PlasticsRubber/GeneralTypes

3 Terms, definitions and conventions

3.1 Overview

It is assumed that basic concepts of OPC UA information modelling are understood in this specification. This specification will use these concepts to describe the OPC 40082-6 Information Model. For the purposes of this document, the terms and definitions given in the documents referenced in Clause 2 apply.

Note that OPC UA terms and terms defined in this specification are *italicized* in the specification.

3.2 Conventions used in this document

The conventions described in OPC 40083 apply.

The same applies to the Container Concept described in OPC 40083, especially the use of the *Property NodeVersion:*

“Several objects can occur several times in the parent object (e.g. several moulds in one machine). For these, container objects are modelled. The benefit is that all instances are collected in one object so that changes can be easily recognized by using a Property NodeVersion which can be subscribed by clients. According to OPC 10000-3 the instances of the container objects shall also trigger a *GeneralModelChangeEvent*.”

3.3 Abbreviations

MES Manufacturing Execution System

IMM Injection Moulding Machine

GDD Granulate drying device

4 General information to OPC UA interfaces for plastics and rubber machinery and OPC UA

For general information on OPC UA interfaces for plastics and rubber machinery and OPC UA see OPC 40083.

5 Use cases

The following functionalities are covered:

– General information about the granulate drying device (manufacturer, model, serial number…), current configuration and status.

– Process information like temperatures and air flow for monitoring and process optimization.

– Energy consumption

– Errors and alarm handling

– Remote control by Start / Stop methods

– Login of the machine user on the granulate drying device

– Maintenance activities

Following functions are not included:

– Safety related signals like emergency stop

6 OPC 40082-6 Information Model Overview

The information model structure of OPC 40082-6 consists of the root *ObjectType GranulateDryingDeviceType*, which contains instances of all other *ObjectTypes* defined in this specification.

The *GranulateDryingDeviceType* is defined in chapter 7. The top level objects are separated by use cases:

- Identification
- Machine state
- Configuration

- User Login handling
- Operation
- Process Monitoring
- Maintenance

7 GranulateDryingDeviceType

7.1 GranulateDryingDeviceType definition

This OPC UA *ObjectType* is used for the root *Object* representing a granulate drying device. It is formally defined in Table 1.

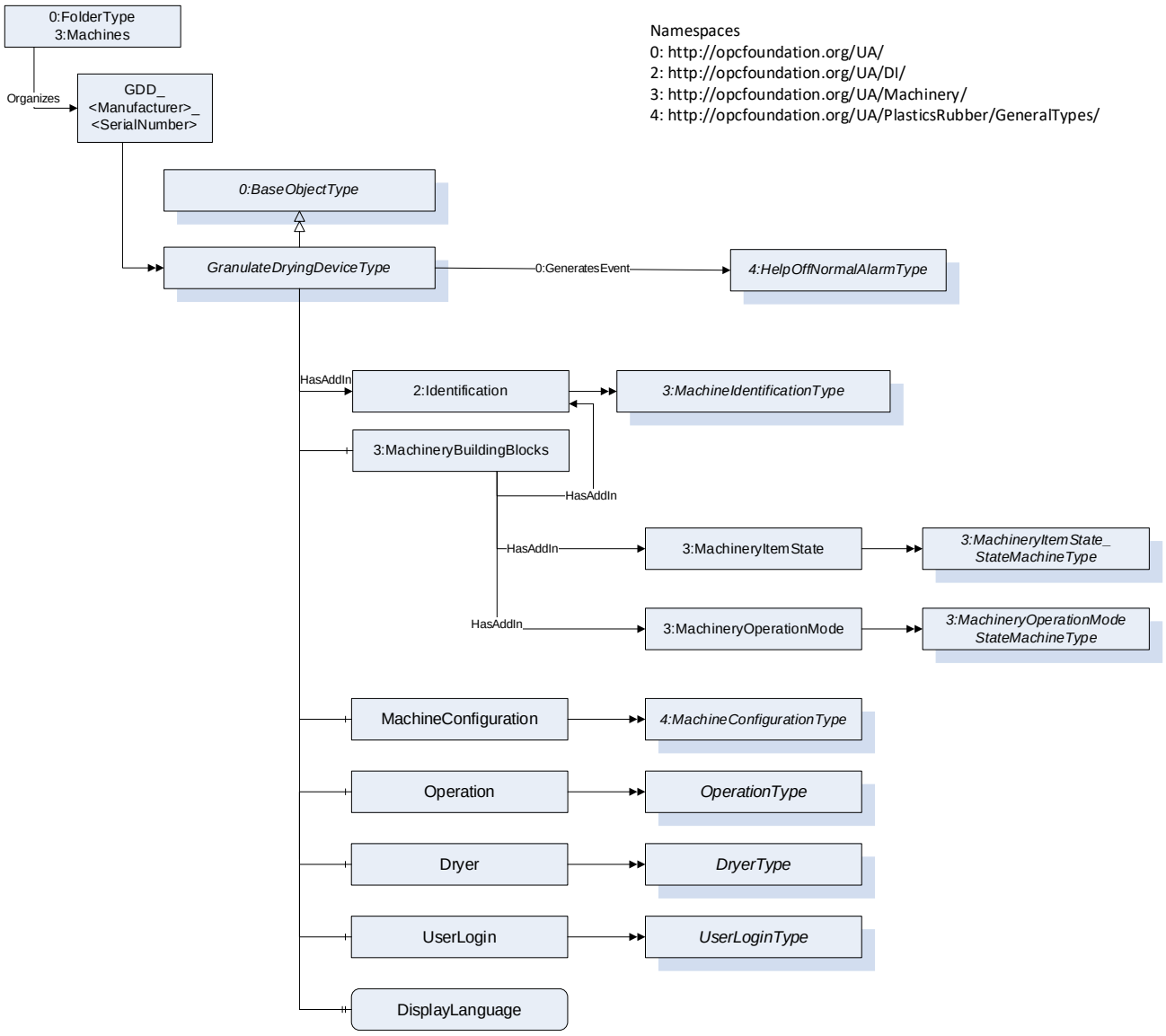

Figure 1 – GranulateDryingDeviceType Overview

The instance(s) of *GranulateDryingDeviceType* shall be located under the *Machines Object* of the Server (see OPC UA for Machinery).

NOTE: If the OPC UA server is implemented in the control of the GDD so only one instance of *GranulateDryingDeviceType* will be created. But it is also possible that one OPC UA server is connected to several GDD controls as aggregating server. In this case several instances of the *GranulateDryingDeviceType* will be created.

Table 1 – GranulateDryingDeviceType Definition

Attribute	Value				
BrowseName	GranulateDryingDeviceType				
IsAbstract	False				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Other**
Subtype of 0:*BaseObjectType* defined in OPC 10000-5					
0:HasAddIn	Object	2:Identification		3:MachineIdentificationType	M
0:HasComponent	Object	3:MachineryBuildingBlocks		0:FolderType	M
0:HasComponent	Object	MachineConfiguration		4:MachineConfigurationType	M
0:HasComponent	Object	UserLogin		UserLoginType	O
0:HasComponent	Object	Operation		OperationType	M
0:HasComponent	Object	Dryer		DryerType	M
0:HasComponent	Variable	DisplayLanguage	0:LocaleId	0:BaseDataVariableType	O,RW
0:GeneratesEvent	Object Type	4:HelpOffNormalAlarmType	Defined in OPC 40083		
Conformance Units					
OPC 40082-6 Basic					

7.2 Identification and MachineryBuildingBlocks

The *MachineIdentificationType* is defined in OPC UA for Machinery (OPC 40001-1) and provides basic information on a machine/device.

For the *InstanceDeclaration* the *ModellingRules* of the *Properties Model* and *DeviceClass* are overridden to mandatory.

The *Object MachineryBuildingBlocks* contains building blocks from OPC UA for Machinery as defined in OPC 40001-1. For this version of OPC 40082-6, the *Object* uses the two *AddIns MachineryItemState* and *MachineryOperationMode*.

Table 2 – GranulateDryingDeviceType Additional Subcomponents

BrowsePath	References	NodeClass	BrowseName	DataType	TypeDefinition	Other
2:Identification	0:HasProperty	Variable	2:Model	0:LocalizedText	0:PropertyType	M, RO
2:Identification	0:HasProperty	Variable	2:DeviceClass	0:String	0:PropertyType	M, RO
3:MachineryBuilding Blocks	0:HasAddIn	Object	2:Identification		3:MachineIdentificationType	M
3:MachineryBuilding Blocks	0:HasAddIn	Object	3:MachineryItem State		3:MachineryItemState_State MachineType	M
3:MachineryBuilding Blocks	0:HasAddIn	Object	3:MachineryOpe rationMode		3:MachineryOperationMode StateMachineType	O

The *DeviceClass Property* shall have the value “Granulate Drying Device”.

7.3 MachineConfiguration

The *MachineConfiguration Object* represents the current configuration of the granulate drying device. The *MachineConfigurationType* is defined in OPC 40083.

7.4 UserLogin

This *Object* provides the option of logging the user of the production machine on and off the GDD system. The *UserLoginType* is defined in chapter 17.

7.5 Operation

This *Object* provides variables and methods required to operate the device. The *OperationType* is defined in chapter 8.

7.6 Dryer

This *Object* contains parameters and process values of the dryer device. The *DryerType* is defined in chapter 9.

7.7 DisplayLanguage

With the *DisplayLanguage Variable* the client can set the desired language on the user interface at the GDD. If the peripheral device does not support the configured language, it can keep the previous setting or use English as the default.

8 OperationType

8.1 OperationType definition

The *ObjectType* of *OperationType* contains components which are necessary to operate the GDD. It is formally defined in Table 3.

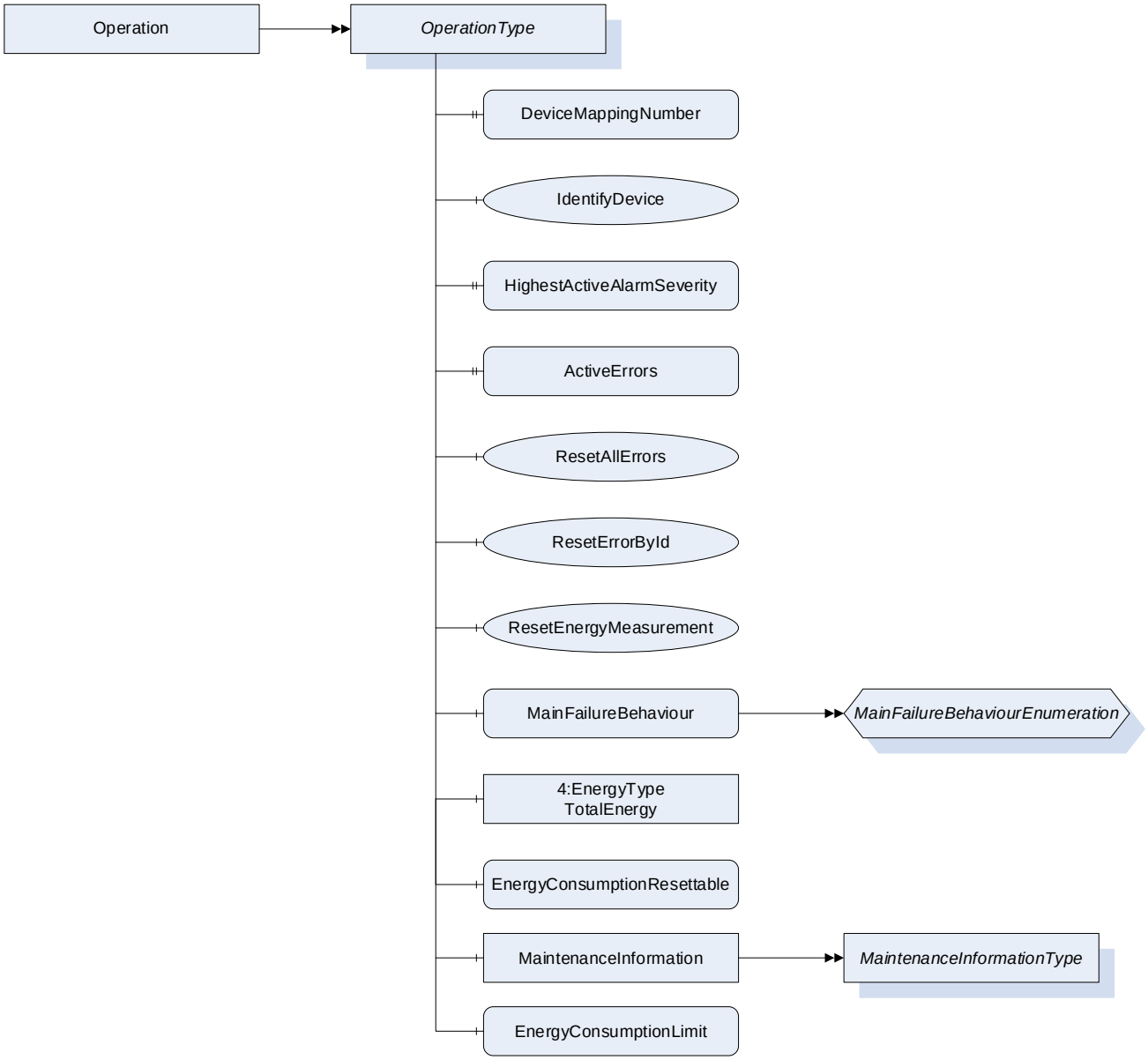

Figure 2 – OperationType overview

Table 3 – OperationType definition

Attribute	Value				
BrowseName	OperationType				
IsAbstract	False				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Other**
Subtype of 0:*BaseObjectType* defined in OPC 10000-5					
0:HasComponent	Variable	DeviceMappingNumber	0:UInt32	0:BaseDataVariableType	M,RW
0:HasComponent	Method	IdentifyDevice			O
0:HasComponent	Variable	HighestActiveAlarmSeverity	0:UInt16	0:BaseDataVariableType	M,RO
0:HasComponent	Variable	ActiveErrors	4:ClassifiedActiveErrorDataType[]	0:BaseDataVariableType	M,RO
0:HasComponent	Method	ResetAllErrors			O
0:HasComponent	Method	ResetErrorById			O
0:HasComponent	Method	ResetEnergyMeasurement			O
0:HasComponent	Variable	MainFailureBehaviour	MainFailureBehaviourEnumeration	0:BaseDataVariableType	O
0:HasComponent	Object	TotalEnergy		4:EnergyType	O
0:HasComponent	Variable	EnergyConsumptionResettable	0:Double	0:AnalogUnitType	O, RO
0:HasComponent	Object	MaintenanceInformation		MaintenanceInformationType	O
0:HasComponent	Variable	EnergyConsumptionLimit	0:Double	0:BaseDataVariableType	O
Conformance Units					
OPC 40082-6 Basic					

8.2 DeviceMappingNumber

Description: Unique identifier/address/number for devices of the same *DeviceType* within a local network. Several peripheral devices of the same *DeviceType* can be connected to an IMM. In most applications, the IMM must map the connected peripheral devices to internal logical devices and channels in a fixed configuration (e.g. dryer systems according to the injection unit).

The mapping must be stable after reconnecting the devices and is therefore not possible via IP addresses, which can be assigned dynamically via DHCP. *DeviceMappingNumber* sets the mapping order of peripheral devices of the same type on the local network and is therefore of type UInt32.

Example: 1

8.3 IdentifyDevice

The peripheral device on which this method is called shows itself by e.g. activation of a LED or by Message on the UI of the device.

Signature: `IdentifyDevice();`

Table 4 – IdentifyDevice Method AddressSpace Definition

Attribute	Value				
BrowseName	IdentifyDevice				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

NOTE: This Method is identical to the IdentifyDevice Method in other specifications of the OPC 40082 series.

8.4 HighestActiveAlarmSeverity

Description: Indication of the severity of the highest active alarm (0 = no active alarm – 1000 = possible error). It provides a minimal error handling for devices without alarm support. However, the variable shall be filled even if alarms are supported.

Example: 400

8.5 ActiveErrors

Description: List of the active errors of the device. It provides a minimal error handling for devices without alarm support. However, the variable shall be filled even if alarms are supported. The *ClassifiedActiveErrorDataType* is defined in OPC 40083. If there is no active error, the array is empty.

The node id is the source id of the drying bin.

8.6 ResetAllErrors

Method to reset all errors of the device.

Signature

```
ResetAllErrors();
```

Table 5 – ResetAllErrors Method AddressSpace Definition

Attribute	Value				
BrowseName	ResetAllErrors				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

8.7 ResetErrorById

Method to reset one error of the device.

Signature

```
ResetErrorById (
   [in]     0:String          Id)
```

Table 6 – ResetErrorById Method Arguments

Argument	Description
Id	Id of the error, listed in *ActiveErrors*, that shall be reset.

Table 7 – ResetErrorById Method AddressSpace Definition

Attribute	Value				
BrowseName	ResetErrorById				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**
0:HasProperty	Variable	0:InputArguments	0:Argument[]	0:PropertyType	0:Mandatory

8.8 ResetEnergyMeasurement

Method to reset the *EnergyConsumptionResettable Variable* of the device and all components (e.g. bins, desiccant bed).

Signature

```
ResetEnergyMeasurement();
```

Table 8 – ResetEnergyMeasurement Method AddressSpace Definition

Attribute	Value				
BrowseName	ResetEnergyMeasurement				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

8.9 MainFailureBehaviour

Determines how the dryer should react after a power failure, for example. The *MainFailureBehaviourEnumeration* is defined in Table 9.

Table 9 – MainFailureBehaviourEnumeration Definition

Name	Value	Description
STANDBY	0	The dryer starts in standby.
CONTINUE	1	The dryer starts in last position.

8.10 TotalEnergy

This *Object* provides information about the actual power and the total lifetime energy consumption of the whole device. The *EnergyType* is defined in OPC 40083.

8.11 EnergyConsumptionResettable

Consumption of the granulate drying device in kWh since the last reset. For information about the reset *method*, see *ResetEnergyMeasurement* in 8.8.

8.12 MaintenanceInformation

This *Object* provides information about all maintenance activities related to the granulate dryer. The *MaintenanceInformationType* is defined in 13.46.

8.13 EnergyConsumptionLimit

This variable limits the energy consumed by the device relative to a user-defined default state (100%).

Example: Set to lower than 100 % when high drying levels are not required.

Can also be used to enable more energy consumption.

Range: 0 % - 200 %

9 DryerType

9.1 DryerType definition

The *DryerType* represents a device which dries the material.

The *DyerType* is formally defined in Table 10.

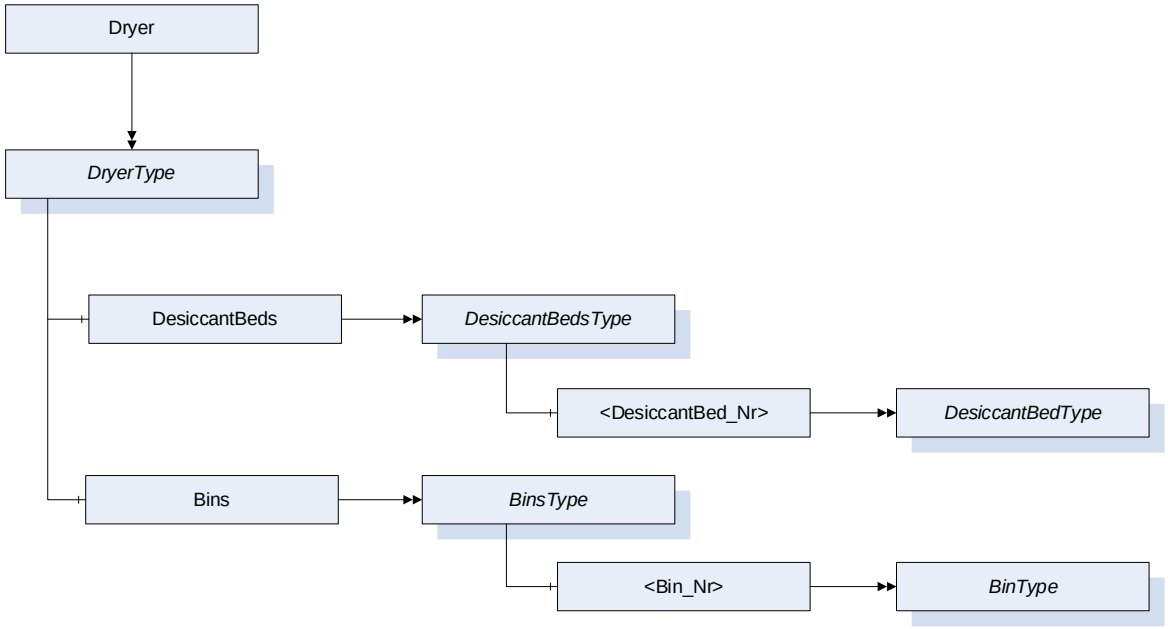

Figure 3 – DryerType overview

Table 10 – DryerType definition

Attribute	**Value**				
BrowseName	DryerType				
IsAbstract	False				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Other**
Subtype of 0:*BaseObjectType* defined in OPC 10000-5					
0:HasComponent	Object	DesiccantBeds		DesiccantBedsType	O
0:HasComponent	Object	Bins		BinsType	M
Conformance Units					
OPC 40082-6 Basic					

9.2 DesiccantBeds

This *Object* is a container for all *DesiccantBeds* in the *Dryer*.The *DesiccantBedsType* is defined in chapter 10.

9.3 Bins

This *Object* is a container for all *Bins* in the *Dryer*.The *BinsType* is defined in chapter 12.

10 DesiccantBedsType

10.1 DessicantBedsType definition

The *DesiccantBedsType* provides a list of all placeholder objects representing desiccant beds of the granulate drying device. The *ObjectType* is defined in Table 11.

Table 11 – DesiccantBedsType Definition

Attribute	**Value**				
BrowseName	DesiccantBedsType				
IsAbstract	False				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Other**
Subtype of 0:*BaseObjectType* defined in OPC 10000-5					
0:HasComponent	Object	<DesiccantBed_Nr>		DesiccantBedType	MP
Conformance Units					
OPC 40082-6 Basic					
OPC 40082-6 DesiccantBeds					

10.2 DesiccantBed

The *DesiccantBed Object* provides information about the desiccant and the desiccant bed used typically in adsorption dryers. The *DesiccantBedType* is defined in chapter 11.

When instances for device *DesiccantBed* are created, the *BrowseNames* shall be “<DesiccantBed_Nr>” (“Nr” starting with 001).

Examples: “DesiccantBed_001”, “ DesiccantBed_002”, “ DesiccantBed_012”, “DesiccantBed_113”.

11 DesiccantBedType

11.1 DesiccantBedType definition

The *DesiccantBedType* represents a desiccant bed (e.g. used in adsorption dryers) and is defined in Table 12.

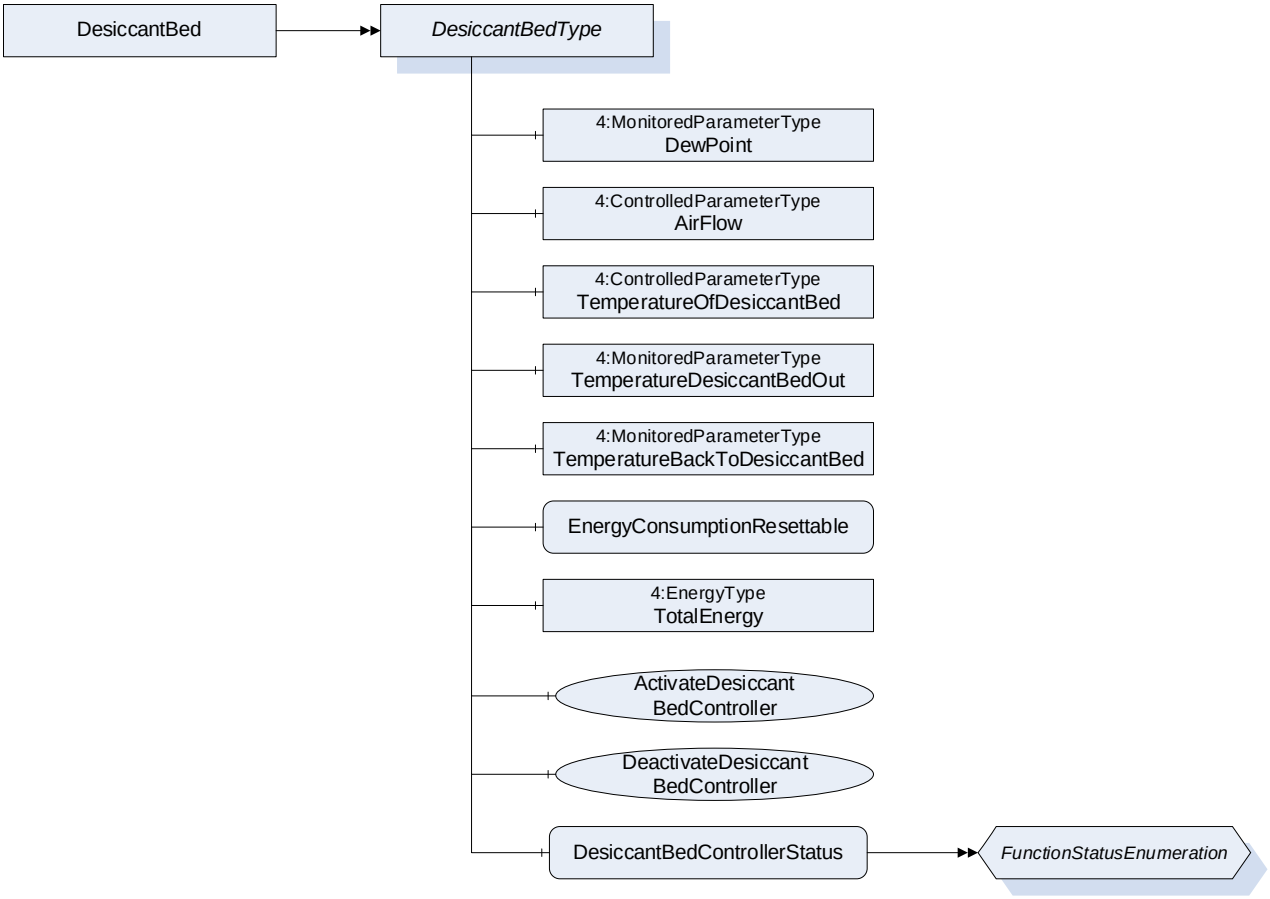

Figure 4 – DesiccantBedType overview

Table 12 – DesiccantBedType definition

Attribute	**Value**				
BrowseName	DesiccantBedType				
IsAbstract	False				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Other**
Subtype of 0:*BaseObjectType* defined in OPC 10000-5					
0:HasComponent	Object	DewPoint		4:MonitoredParameterType	O
0:HasComponent	Object	AirFlow		4:ControlledParameterType	O
0:HasComponent	Object	TemperatureOfDesiccantBed		4:ControlledParameterType	O
0:HasComponent	Object	TemperatureDesiccantBedOut		4:MonitoredParameterType	O
0:HasComponent	Object	TemperatureBackToDesiccantBed		4:MonitoredParameterType	O
0:HasComponent	Variable	EnergyConsumptionResettable	0:Double	0:AnalogUnitType	O,RO
0:HasComponent	Object	TotalEnergy		4:EnergyType	O
0:HasComponent	Method	ActivateDesiccantBedController			O
0:HasComponent	Method	DeactivateDesiccantBedController			O
0:HasComponent	Variable	DesiccantBedControllerStatus	FunctionStatusEnumeration	0:BaseDataVariableType	O,RO
Conformance Units					
OPC 40082-6 DesiccantBeds					

11.2 DewPoint

Setpoint and actual value of dewpoint monitored in °C or °F.

11.3 AirFlow

AirDryer with flow control for setting the mass of flow in l/s or cfm.

11.4 TemperatureOfDesiccantBed

Controlled temperature in the desiccant bed in °C or °F.

11.5 TemperatureDesiccantBedOut

Monitored temperature outlet of the desiccant bed in °C or °F.

11.6 TemperatureBackToDesiccantBed

Monitored temperature air flow back to the desiccant bed in °C or °F.

11.7 EnergyConsumptionResettable

Monitored energy consumption of the heater in the desiccant bed in kWh.

Resettable with *ResetEnergyMeasurement Method.*

11.8 TotalEnergy

This *Object* provides information about the actual power and the total lifetime energy consumption of the whole device. The *EnergyType* is defined in OPC 40083.

11.9 ActivateDesiccantBedController

Method to request the desiccant bed controller to be switched on. The Server response is provided in the *DesiccantBedControllerStatus Variable.*

When it is switched *off*, there is no power control. Only the actual temperature value is measured cyclically.

Signature

```
ActivateDesiccantBedController();
```

Table 13 – ActivateDesiccantBedController Method AddressSpace Definition

Attribute	Value				
BrowseName	ActivateDesiccantBedController				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

11.10 DeactivateDesiccantBedController

Method to request the desiccant bed controller to be switched off. The Server response is provided in the *DesiccantBedControllerStatus Variable.*

When it is switched *off*, there is no power control. Only the actual temperature value is measured cyclically.

Signature

```
DeactivateDesiccantBedController();
```

Table 14 – DeactivateDesiccantBedController Method AddressSpace Definition

Attribute	Value				
BrowseName	DeactivateDesiccantBedController				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

11.11 DesiccantBedControllerStatus

Provides information about the current operation state of the desiccant bed controller.

The *FunctionStatusEnumeration* is defined in Table 15.

Table 15 –FunctionStatusEnumeration Definition

Name	Value	Description
OFF	0	Function is switched off
ON	1	Function is switched on
REQUESTED_OFF	2	Function is switched on AND requested to be switched off by the client
REQUESTED_ON	3	Function is switched off AND requested to be switched on by the client

12 BinsType

12.1 BinsType definition

The *BinsType* provides a list of all placeholder objects representing bins of the granulate drying device.

The *ObjectType* is formally defined in Table 16.

Table 16 – BinsType definition

Attribute	Value				
BrowseName	BinsType				
IsAbstract	False				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Other**
Subtype of 0:*BaseObjectType* defined in OPC 10000-5					
0:HasComponent	Object	<Bin_Nr>		BinType	MP
Conformance Units					
OPC 40082-6 Basic					

12.2 Bin

Mandatory Placeholder Object which contains all bins of the dryer. The *BinType* is defined in chapter 13.

When instances for device *bins* are created, the *BrowseNames* shall be “<Bin_Nr>” (“Nr” starting with 001).

Examples: “Bin_001”, “Bin_002”, “Bin_012”, “Bin_113”.

13 BinType

13.1 BinType definition

The *BinType* represents all functionalities of a bin, such as temperature monitoring or control and is formally defined in Table 17.

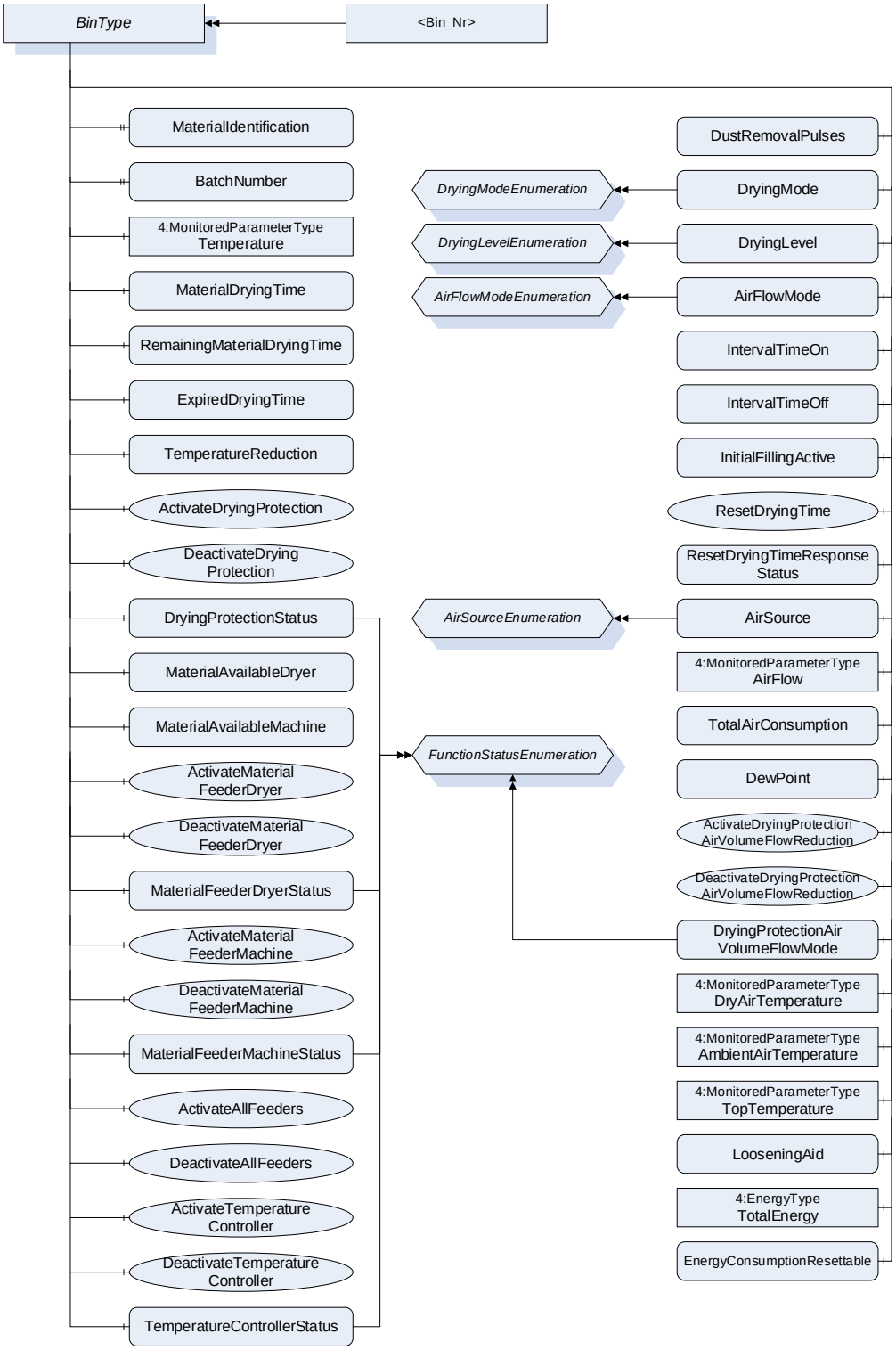

Figure 5 – BinType overview

Table 17 – BinType definition

Attribute	Value
BrowseName	BinType
IsAbstract	False

References	Node Class	BrowseName	DataType	TypeDefinition	Other
Subtype of 0:*BaseObjectType* defined in OPC 10000-5					
0:HasProperty	Variable	MaterialIdentification	0:String	0:PropertyType	O,RW
0:HasProperty	Variable	BatchNumber	0:String	0:PropertyType	O,RW
0:HasComponent	Object	Temperature		4:MonitoredParameterType	M
0:HasProperty	Variable	MaterialDryingTime	0:Duration	0:PropertyType	O,RW
0:HasComponent	Variable	RemainingMaterialDryingTime	0:Duration	0:BaseDataVariableType	O, RO
0:HasComponent	Variable	ExpiredDryingTime	0:Duration	0:BaseDataVariableType	O, RO
0:HasComponent	Variable	TemperatureReduction	0:Double	0:AnalogUnitRangeType	O, RW
0:HasComponent	Method	ActivateDryingProtection			O
0:HasComponent	Method	DeactivateDryingProtection			O
0:HasComponent	Variable	DryingProtectionStatus	FunctionStatusEnumeration	0:BaseDataVariableType	O,RO
0:HasComponent	Variable	MaterialAvailableDryer	0:Boolean	0:BaseDataVariableType	O, RO
0:HasComponent	Variable	MaterialAvailableMachine	0:Boolean	0:BaseDataVariableType	O, RO
0:HasComponent	Method	ActivateMaterialFeederDryer			O
0:HasComponent	Method	DeactivateMaterialFeederDryer			O
0:HasComponent	Variable	MaterialFeederDryerStatus	FunctionStatusEnumeration	0:BaseDataVariableType	O,RO
0:HasComponent	Method	ActivateMaterialFeederMachine			O
0:HasComponent	Method	DeactivateMaterialFeederMachine			O
0:HasComponent	Variable	MaterialFeederMachineStatus	FunctionStatusEnumeration	0:BaseDataVariableType	O,RO
0:HasComponent	Method	ActivateAllFeeders			O
0:HasComponent	Method	DeactivateAllFeeders			O
0:HasComponent	Method	ActivateTemperatureController			O
0:HasComponent	Method	DeactivateTemperatureController			O
0:HasComponent	Variable	TemperatureControllerStatus	FunctionStatusEnumeration	0:BaseDataVariableType	O,RO
0:HasComponent	Variable	DustRemovalPulses	0:UInt16	0:BaseDataVariableType	O, RW
0:HasComponent	Variable	DryingMode	DryingModeEnumeration	0:BaseDataVariableType	O, RW
0:HasComponent	Variable	DryingLevel	DryingLevelEnumeration	0:BaseDataVariableType	O, RW
0:HasComponent	Variable	AirFlowMode	AirFlowModeEnumeration	0:BaseDataVariableType	O, RW
0:HasComponent	Variable	IntervalTimeOn	0:Duration	0:BaseDataVariableType	O, RW
0:HasComponent	Variable	IntervalTimeOff	0:Duration	0:BaseDataVariableType	O, RW
0:HasComponent	Variable	InitialFillingActive	0:Boolean	0:BaseDataVariableType	O, RO
0:HasComponent	Method	ResetDryingTime			O
0:HasComponent	Variable	ResetDryingTimeResponseStatus	0:UtcTime	0:BaseDataVariableType	O, RO
0:HasComponent	Variable	AirSource	AirSourceEnumeration	0:BaseDataVariableType	O, RW
0:HasComponent	Object	AirFlow		4:MonitoredParameterType	O
0:HasComponent	Variable	TotalAirConsumption	0:Double	0:AnalogUnitType	O, RO
0:HasComponent	Variable	DewPoint	0:Double	0:AnalogUnitType	O, RO
0:HasComponent	Method	ActivateDryingProtectionAirVolumeFlowReduction			O
0:HasComponent	Method	DeactivateDryingProtectionAirVolumeFlowReduction			O
0:HasComponent	Variable	DryingProtectionAirVolumeFlowMode	FunctionStatusEnumeration	0:BaseDataVariableType	O,RO
0:HasComponent	Object	DryAirTemperature		4:MonitoredParameterType	O
0:HasComponent	Object	AmbientAirTemperature		4:MonitoredParameterType	O
0:HasComponent	Object	TopTemperature		4:MonitoredParameterType	O
0:HasComponent	Variable	LooseningAid	0:UInt16	0:BaseDataVariableType	O, RW

Attribute	Value
BrowseName	BinType
IsAbstract	False

References	Node Class	BrowseName	DataType	TypeDefinition	Other
Subtype of 0:*BaseObjectType* defined in OPC 10000-5					
0:HasComponent	Object	TotalEnergy		4:EnergyType	O
0:HasComponent	Variable	EnergyConsumptionResettable	0:Double	0:AnalogUnitType	O, RO
ConformanceUnits					
OPC 40082-6 Basic					

13.2 MaterialIdentification

The product name of the material.

13.3 BatchNumber

A number for the specific production line and time.

13.4 Temperature

The drying temperature for the material in °C or °F.

The *MonitoredParameterType* is defined in OPC 40083.

13.5 MaterialDryingTime

Material manufacturer time value as setpoint to dry the material until ready for production.

13.6 RemainingMaterialDryingTime

Actual remaining time to dry the material until ready for production.

13.7 ExpiredDryingTime

Elapsed drying time, useful for a continuous drying process.

13.8 TemperatureReduction

To protect or store the material after drying, it's possible to reduce the temperature inside the bin. The value indicates by how much the temperature is lowered (relative value) in K.

In CONTINUOUS *DryingMode,* the reduction is applied during drying protection if activated.

In BATCH *DryingMode,* the reduction is applied as storage temperature reduction for (long time) storage of dried material.

Storage reduction is usually higher than drying protection reduction.

13.9 ActivateDryingProtection

Method to activate the drying protection. Does not affect storage temperature reduction (in batch drying mode temperature will be reduced to storage temperature even when drying protection is switched off).

When activated, the temperature reduction given in the *TemperatureReduction Variable* gets applied after drying time. The protection will be reset after each material load.

Signature

```
ActivateDryingProtection();
```

Table 18 – ActivateDryingProtection Method AddressSpace Definition

Attribute	Value				
BrowseName	ActivateDryingProtection				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

13.10 DeactivateDryingProtection

Method to deactivate the drying protection.

Signature

```
DeactivateDryingProtection();
```

Table 19 – DeactivateDryingProtection Method AddressSpace Definition

Attribute	Value				
BrowseName	DeactivateDryingProtection				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

13.11 DryingProtectionStatus

Provides information about the current activation state of the drying protection.

The *FunctionStatusEnumeration* is defined in Table 15.

13.12 MaterialAvailableDryer

Feedback from the dryer about the filling level of the conveyor for filling the dryer (only if controlled via dryer).

Provides information, if material is available to fill the dryer.

13.13 MaterialAvailableMachine

Feedback from the dryer about the fill level of the conveyor for removal from the dryer to the injection molding machine (only if controlled via dryer).

Provides only the information, if material is available without information about the material condition (dry / wet). Consider *RemainingMaterialDryingTime* to check the material condition.

13.14 ActivateMaterialFeederDryer

Method to activate the material feeder of the dryer.

If the material level is low, the material feeder starts automatic filling the Dryer.

Signature

```
ActivateMaterialFeederDryer();
```

Table 20 – ActivateMaterialFeederDryer Method AddressSpace Definition

Attribute	Value				
BrowseName	ActivateMaterialFeederDryer				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

13.15 DeactivateMaterialFeederDryer

Method to deactivate the material feeder of the dryer.

Signature

```
DeactivateMaterialFeederDryer();
```

Table 21 – DeactivateMaterialFeederDryer Method AddressSpace Definition

Attribute	Value				
BrowseName	DeactivateMaterialFeederDryer				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

13.16 MaterialFeederDryerStatus

Provides information about the current activation state of the material feeder of the dryer.

The *FunctionStatusEnumeration* is defined in Table 15.

13.17 ActivateMaterialFeederMachine

Method to activate the material feeder of the machine.

If the material level is low, the material feeder starts automatic filling the injection molding machine.

Signature

```
ActivateMaterialFeederMachine();
```

Table 22 – ActivateMaterialFeederMachine Method AddressSpace Definition

Attribute	Value				
BrowseName	ActivateMaterialFeederMachine				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

13.18 DeactivateMaterialFeederMachine

Method to deactivate the material feeder of the machine.

Signature

```
DeactivateMaterialFeederMachine();
```

Table 23 – DeactivateMaterialFeederMachine Method AddressSpace Definition

Attribute	Value				
BrowseName	DeactivateMaterialFeederMachine				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

13.19 MaterialFeederMachineStatus

Provides information about the current activation state of the material feeder of the machine.

The *FunctionStatusEnumeration* is defined in Table 15.

13.20 ActivateAllFeeders

Method to activate all feeders at once.

Used if the feeders can not be activated seperately. *ActivateMaterialFeeder* ist the same as activate both *ActivateMaterialFeederDryer* and *ActivateMaterialFeederMachine*.

Signature

```
ActivateAllFeeders();
```

Table 24 – ActivateAllFeeders Method AddressSpace Definition

Attribute	Value				
BrowseName	ActivateAllFeeders				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

13.21 DeactivateAllFeeders

Method to deactivate all feeders at once.

Signature

```
DeactivateAllFeeders();
```

Table 25 – DeactivateAllFeeders Method AddressSpace Definition

Attribute	Value				
BrowseName	DeactivateAllFeeders				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

13.22 ActivateTemperatureController

Method to request the activation of the temperature controller of the bin. When it is switched *off*, there is no power control. Only the actual temperature value is measured cyclically.

Signature

```
ActivateTemperatureController();
```

Table 26 – ActivateTemperatureController Method AddressSpace Definition

Attribute	Value				
BrowseName	ActivateTemperatureController				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

13.23 DeactivateTemperatureController

Method to request the deactivation of the temperature controller of the bin.

Signature

```
DeactivateTemperatureController();
```

Table 27 – DeactivateTemperatureController Method AddressSpace Definition

Attribute	Value				
BrowseName	DeactivateTemperatureController				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

13.24 TemperatureControllerStatus

Provides information about the current activation state of the bin temperature controller.

The *FunctionStatusEnumeration* is defined in Table 15.

13.25 DustRemovalPulses

Number of dust removal pulses, automatically triggered after filling.

13.26 DryingMode

The drying mode determines the drying process. The *DryingModeEnumeration* is defined in Table 28.

Table 28 – DryingModeEnumeration Definition

Name	Value	Description
BATCH	0	The granulate in the dryer is dried for a certain period of time and then switched to drying protection.
CONTINUOUS	1	The granulate in the dryer is dried continuously.
COMBINED	2	The very wet granulate in the dryer is dried for a certain period of time, after which it is dried continuously.

13.27 DryingLevel

The drying level indicates how much drying is required. The *DryingLevelEnumeration* is defined in Table 29.

Table 29 – DryingLevelEnumeration Definition

Name	Value	Description
LOW	0	The granulate requires a low level drying.
MEDIUM	1	The granulate requires a medium level drying.
HIGH	2	The granulate requires a high level drying.

13.28 AirFlowMode

The *AirFlowMode* determines the air flow, either from a fan or from compressed air. The *AirFlowModeEnumeration* is defined in Table 30.

Table 30 – AirFlowModeEnumeration Definition

Name	Value	Description
CONTINUOUS	0	constant flow
INTERVAL	1	changing cyclic between low or no and high or normal flow
OPTIMIZED	2	Energy optimized mode (depending e.g. on throughput / humidity…)

13.29 IntervallTimeOn

If *AirFlowMode* in INTERVAL mode is activated, this parameter determines the time for normal or high rotation.

13.30 IntervallTimeOff

If *AirFlowMode* in INTERVAL mode is activated, this parameter determines the time for no or low rotation.

13.31 InitialFillingActive

True, while the initial filling process is active (e.g. to prevent conveyor timeout error).

13.32 ResetDryingTime

Method to restart the drying timer (Resets *RemainingMaterialDryingTime* to its initial value).

Signature

```
ResetDryingTime();
```

Table 31 – ResetDryingTime Method AddressSpace Definition

Attribute	Value				
BrowseName	ResetDryingTime				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

13.33 ResetDryingTimeResponseStatus

Provides the timestamp since the last *ResetDryingTime* method was received as a response value.

13.34 AirSource

Determines the source of the air.

Table 32 – AirSourceEnumeration Definition

Name	Value	Description
FRESH_AIR	0	The dryer is working with fresh air
RETURN_AIR	1	The dryer is working with return air, closed loop

13.35 AirFlow

Air consumption currently required for the drying process.

Unit: m³/h (Note: norm m³/h Nm³/h) or cfm.

13.36 TotalAirConsumption

The total air consumption during the current drying process.

Unit: m³ or cf.

13.37 DewPoint

Dew point of the air used to dry the granulate in °C or °F.

13.38 ActivateDryingProtectionAirVolumeFlowReduction

Request to reduce the (compressed) air flow during drying protection or storage reduction (*TemperatureReduction* is active).

The Server response is provided in the *DryingProtectionAirVolumeFlowMode Variable.*

Signature

```
ActivateDryingProtectionAirVolumeFlowReduction();
```

Table 33 – ActivateDryingProtectionAirVolumeFlowReduction Method AddressSpace Definition

Attribute	Value				
BrowseName	ActivateDryingProtectionAirVolumeFlowReduction				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

13.39 DeactivateDryingProtectionAirVolumeFlowReduction

Request to deactivate the use of reduced air flow during drying protection or storage reduction.

The Server response is provided in the *DryingProtectionAirVolumeFlowMode Variable.*

Signature

```
DeactivateDryingProtectionAirVolumeFlowReduction();
```

Table 34 – DeactivateDryingProtectionAirVolumeFlowReduction Method AddressSpace Definition

Attribute	Value				
BrowseName	DeactivateDryingProtectionAirVolumeFlowReduction				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Modelling Rule**

13.40 DryingProtectionAirVolumeFlowMode

Response to the *ActivateDryingProtectionAirVolumeFlowReduction Method.*

The *FunctionStatusEnumeration* is defined in Table 15.

13.41 DryAirTemperature

Drying temperature in the dry air circuit in °C or °F.

13.42 AmbientAirTemperature

Drying temperature in the circulating air circuit in °C or °F.

13.43 TopTemperature

Temperature in drying container top in °C or °F.

13.44 LooseningAid

Number of air impulses as loosening aid at outlet of granulate dryer.

13.45 TotalEnergy

This *Object* provides information about the actual power and the total lifetime energy consumption of the single bin. The *EnergyType* is defined in OPC 40083.

13.46 EnergyConsumptionResettable

Consumption of the *Bin* in kWh since the last reset. For information about the reset *method*, see *ResetEnergyMeasurement* in 8.8.

14 MaintenanceInformationType

14.1 MaintenanceInformationType definition

The *MaintenanceInformationType* provides information about all maintenance activities related to the granulate dryer and is formally defined in Table 35. Each instance of the *<Maintenance_Nr> placeholder* represents a maintenance activity category (examples: lubrication, inspection…).

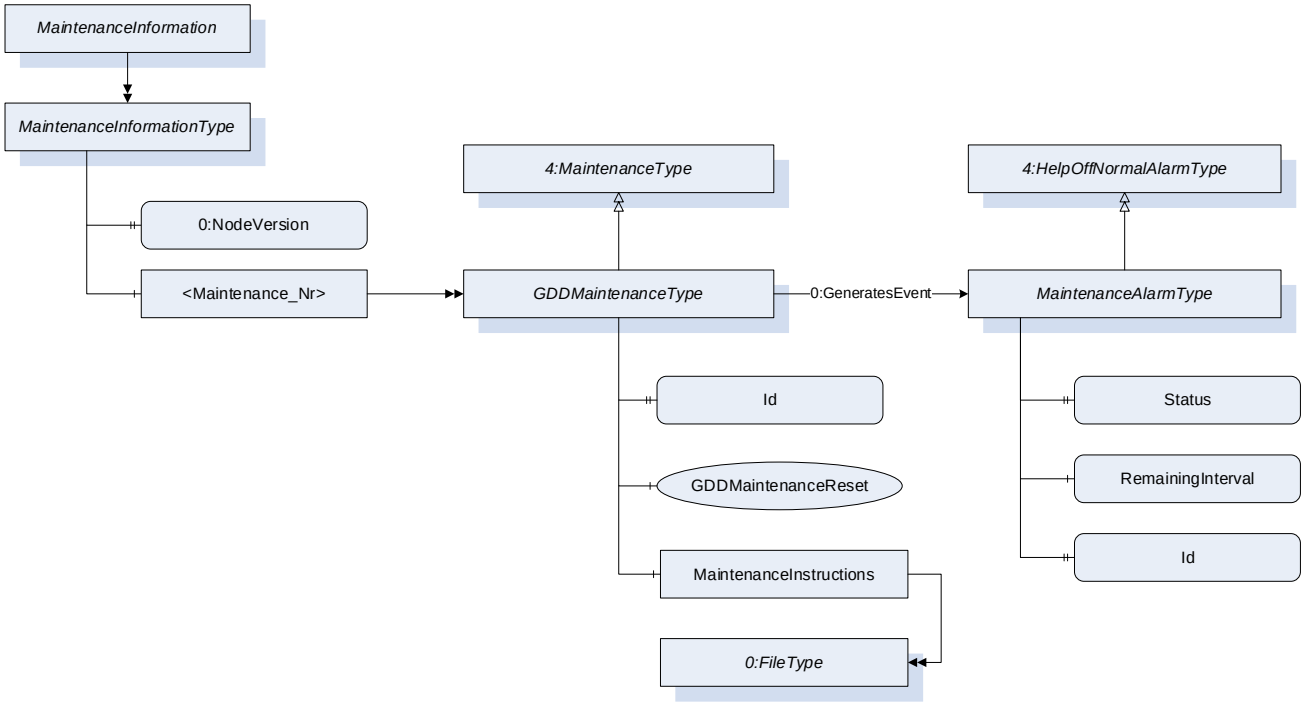

Figure 6 – MaintenanceInformationType overview

Table 35 – MaintenanceInformationType Definition

Attribute	**Value**				
BrowseName	MaintenanceInformationType				
IsAbstract	False				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Other**
Subtype of the 0:*BaseObjectType* defined in OPC 10000-5					
0:HasProperty	Variable	0:NodeVersion	0:String	0:PropertyType	M, RO
0:HasComponent	Object	<Maintenance_Nr>		GDDMaintenanceType	MP
Conformance Units					
OPC 40082-6 Maintenance					

When instances for *Maintenance* are created, the *BrowseNames* shall be "<Maintenance_Nr>" where Nr is a three-digit number with leading zeros, starting with "001". The *GDDMaintenanceType* is defined in chapter 15.

15 GDDMaintenanceType

15.1 GDDMaintenanceType definition

The *GDDMaintenanceType* provides information about a single maintenance activity related to the granulate dryer and is formally defined in. The *GDDMaintenanceType* is a subtype of the *MaintenanceType* defined in OPC 40083.

For identification of the maintenance activity (examples: lubrication, inspection…) the *Node Attributes DisplayName* and *Description* shall be used.

Table 36 – GDDMaintenanceType Definition

Attribute	**Value**				
BrowseName	GDDMaintenanceType				
IsAbstract	False				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Other**
Subtype of the 4:*MaintenanceType* defined in OPC 40083					
0:HasProperty	Variable	Id	0:String	0:PropertyType	M,RO
0:HasComponent	Method	GDDMaintenanceReset			M
0:HasComponent	Object	MaintenanceInstructions		0:FileType	O
0:GeneratesEvent	ObjectType	MaintenanceAlarmType	Defined in chapter 16		
Conformance Units					
OPC 40082-6 Maintenance					

15.2 Id

Unique Id of the maintenance activity.

15.3 GDDMaintenanceReset

The *Method GDDMaintenanceReset* is used to indicate that the maintenance activity has been carried out. Although the *Method Reset* is mandatory in the *MaintenanceType* of OPC 40083, the *Method GDDMaintenanceReset* shall be used when performing maintenance activities at the mould.

The signature of this *Method* is specified below. Table 37 and Table 38 specify the *Arguments* and *AdressSpace* representation, respectively.

Signature

```
GDDMaintenanceReset (
   [in]    0:String          OperatorName,
   [in]    0:String          MachineManufacturer,
   [in]    0:String          MachineSerialNumber
)
```

Table 37 – GDDMaintenanceReset Method Arguments

Argument	**Description**
OperatorName	Name of the operator that has carried out the maintenance
MachineManufacturer	Manufacturer of the machine on which the GDD was mounted during maintenance
MachineSerialNumber	Serial number of the machine on which the GDD was mounted during maintenance

Table 38 – GDDMaintenanceReset Method AddressSpace Definition

Attribute	**Value**				
BrowseName	GDDMaintenanceReset				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**ModellingRule**
0:HasProperty	Variable	0:InputArguments	0:Argument[]	0:PropertyType	M

15.4 MaintenanceInstructions

The *MaintenanceInstructions Object* provides any file with further information to support the maintenance activity (e.g. Maintenance instructions with pictures and graphics).

16 MaintenanceAlarmType

16.1 MaintenanceAlarmType definition

The *MaintenanceAlarmType* is active when the maintenance *Status* is DUE or WARNING. It is a *SubType* of the *HelpOffNormalAlarmType* (defined in OPC 40083) and is formally defined in Table 39.

e.g.: HelpText = *AdditionalInformation* string.

Table 39 – MaintenanceAlarmType Definition

Attribute	**Value**				
BrowseName	MaintenanceAlarmType				
IsAbstract	True				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Other**
Subtype of the 4:HelpOffNormalAlarmType defined in OPC 40083					
0:HasComponent	Variable	Status	4:MaintenanceStatusEnumeration	0:BaseDataVariableType	M
0:HasComponent	Variable	RemainingInterval	0:Double	0:AnalogUnitType	O
0:HasProperty	Variable	Id	0:String	0:PropertyType	M
Conformance Units					
OPC 40082-6 Maintenance					

16.2 Status

Maintenance status of the respective maintenance activity. The *MaintenanceStatusEnumeration Enumeration* is defined in OPC 40083.

16.3 RemainingInterval

Interval before next maintenance is due.

For units, see the *Interval variable* in the *GDDMaintenanceType* respectively its parent object 4:*MaintenanceType.*

16.4 Id

Unique Id of the maintenance activity.

17 UserLoginType

17.1 UserLoginType definition

This *ObjectType* allows to automatically transfer the login information of the user logged in on the production machine to the granulate dryer so that there no separate login is necessary.

The GDD as server shows the user who is currently logged in at the device and provides *Method*s to pass the user currently logged in to the machine to the GDD. The *Methods* for the remote logging in/out shall be called automatically by the machine when a user logs in/out there. The device can decide whether to accept the login of the machine user via OPC UA or to deny the *Method* with an error code, e.g. if a user is already logged in at the device itself or the machine is not authorized.

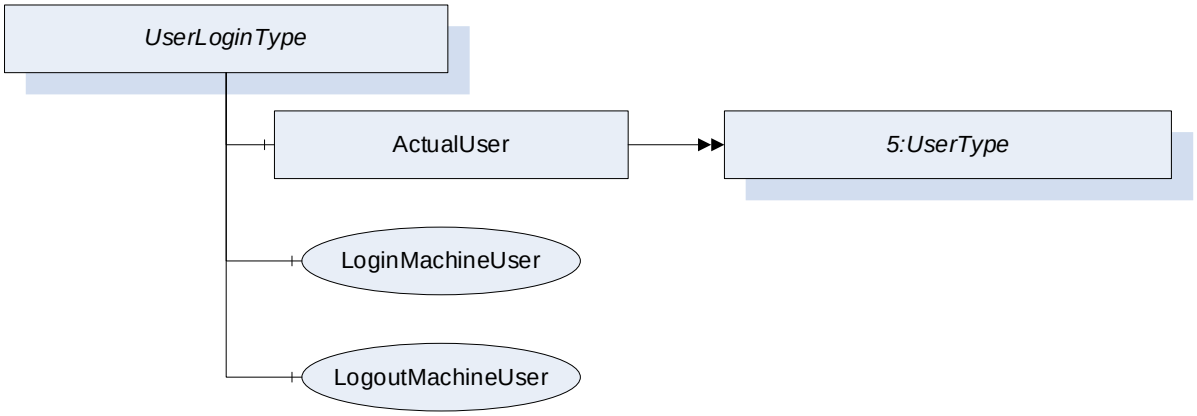

Figure 7 – UserLoginType Overview

Table 40 – UserLoginType Definiton

Attribute	**Value**				
BrowseName	UserLoginType				
IsAbstract	False				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**Other**
Subtype of the 0:*BaseObjectType* defined in OPC 10000-5					
HasComponent	Object	ActualUser		4:UserType	M
HasComponent	Method	LoginMachineUser			M
HasComponent	Method	LogoutMachineUser			M
Conformance Units					
OPC 40082-6 Users					

17.2 ActualUser

The *ActualUser Object* holds always the actual active user on the GDD system (HMI). If a remote login of a machine user via the *Method LoginMachineUser* is successful, the user should appear in this variable. If the machine user is logged out via the *Method LogoutMachineUser,* the *IsPresent* property of the *ActualUser* becomes *false*. The *UserType* is defined in OPC 40083.

17.3 LoginMachineUser

When the *Method LoginMachineUser* from the GDD is called by the machine, the requested user can be logged in to the device system. If a user is already logged in to the device or the passed arguments cannot be interpreted or supported, the server can deny the *Method* and *ActualUser* remains unchanged.

Signature

```
LoginMachineUser (
   [in]  0:String              Id,
   [in]  0:String              Name,
   [in]  0:String              CardUid,
   [in]  0:String              UserLevel,
   [in]  0:String              UserRole,
   [in]  0:LocaleId            Language);
```

Table 41 – LoginMachineUser Method Arguments

Argument	Description
Id	The *Id* of the user according to 4:*UserType*
Name	The *Name* of the user according to 4:*UserType*
CardUid	The *CardUid* of the user according to 4:*UserType*
UserLevel	The *UserLevel* of the user according to 4:*UserType*
UserRole	The *UserRole* of the user according to 4:*UserType*
Language	The *Language* of the user according to 4:*UserType*

All arguments may contain empty Strings if not supported.

Table 42 – LoginMachineUser Method AddressSpace Definiton

Attribute	Value				
BrowseName	LoginMachineUser				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**ModellingRule**
0:HasProperty	Variable	0:InputArguments	0:Argument[]	0:PropertyType	0:Mandatory

17.4 LogoutMachineUser

The machine shall report to the device via the *Method LogoutMachineUser* when a user is logged out. The *IsPresent* property of the ActualUser then becomes false again.

Signature

```
LogoutMachineUser();
```

The *Method* has no *Input*- or *OutputArguments*.

Table 43 – LogoutMachineUser Method AddressSpace Definiton

Attribute	Value				
BrowseName	LogoutMachineUser				
References	**Node Class**	**BrowseName**	**DataType**	**TypeDefinition**	**ModellingRule**

18 Profiles and Conformance Units

This chapter defines the corresponding profiles and conformance units for the OPC UA Information Model for OPC 40082-6. *Profiles* are named groupings of conformance units. Facets are profiles that will be combined with other *Profiles* to define the complete functionality of an OPC UA *Server* or *Client.*

18.1 Conformance Units

This chapter defines the corresponding *Conformance Unit* for OPC 40082-6.

Table 44 – Conformance Units for OPC 40082-6

Category	Title	Description
Server	OPC 40082-6 Basic	Support of *GranulateDryingDeviceType* and all mandatory child elements giving information on the dosing system and its status. There is at least one instance of the *GranulateDryingDeviceType* in the *Machines Object.*
Server	OPC 40082-6 Maintenance	Support of *MaintenanceInformationType* and all mandatory child elements giving information on the maintenance activities on the mould.
Server	OPC 40082-6 Users	Support of *UserLoginType* to enable automatic login of the machine user onto the mould controller.
Server	OPC 40082-6 DesiccantBeds	Support of *DesiccantBedsType* to cover dryers with desiccant beds.

18.2 Profiles

18.2.1 Profile list

The following tables specify the facets available for *Servers* that implement the OPC 40082-6 Information Model companion specification.

NOTE: The names of the supported profiles are available in the *Server Object* under *ServerCapabilities.ServerProfileArray*

Table 45 lists all Profiles defined in this document and defines their URIs.

Table 45 – Profile URIs for OPC 40082-6

Profile	URI
OPC 40082-6 Basic Server Profile	http://opcfoundation.org/UA-Profile/PlasticsRubber/GDD/Server/Basic

18.2.2 Server Facets

18.2.2.1 Overview

The following sections specify the *Facets* available for *Servers* that implement the OPC 40082-6 companion specification. Each section defines and describes a *Facet* or *Profile*.

18.2.2.2 OPC 40082-6 Basic Server Profile

Table 46 – OPC 40082-6 Basic Server Profile

Group	Conformance Unit / Profile Title	Mandatory / Optional
Profile	0:Embedded Server 2017 (defined in OPC 10000-7)	M
Profile	0:ComplexType Server Facet (defined in OPC 10000-7)	M
Profile	0:Standard Event Subscription Server Facet (defined in OPC 10000-7)	M
Profile	0:Method Server Facet (defined in OPC 10000-7)	M
Profile	2:BaseDevice Server Facet (defined in OPC 10000-100)	M
Profile	3:Machinery Machine Identification Server Facet	M
Profile	3:Machinery State Server Facet	M
Profile	0:A & C Alarm Server Facet	M
OPC 40082-6	OPC 40082-6 Basic	M
OPC 40082-6	OPC 40082-6 Maintenance	O
OPC 40082-6	OPC 40082-6 Users	O
OPC 40082-6	OPC 40082-6 DesiccantBeds	O

19 Namespaces

19.1 Namespace Metadata

Table 47 defines the namespace metadata for this document. The *Object* is used to provide version information for the namespace and an indication about static *Nodes*. Static *Nodes* are identical for all *Attributes* in all *Servers*, including the *Value Attribute*. See OPC 10000-5 for more details.

The information is provided as *Object* of type *NamespaceMetadataType*. This *Object* is a component of the *Namespaces Object* that is part of the *Server Object*. The *NamespaceMetadataType ObjectType* and its *Properties* are defined in OPC 10000-5.

The version information is also provided as part of the ModelTableEntry in the UANodeSet XML file. The UANodeSet XML schema is defined in OPC 10000-6.

Table 47 – NamespaceMetadata Object for this Document

Attribute	**Value**	
BrowseName	http://opcfoundation.org/UA/PlasticsRubber/GDD/	
Property	**DataType**	**Value**
NamespaceUri	String	http://opcfoundation.org/UA/PlasticsRubber/GDD/
NamespaceVersion	String	RC 1.0.0
NamespacePublicationDate	DateTime	2025-06-01
IsNamespaceSubset	Boolean	False
StaticNodeIdTypes	IdType []	0
StaticNumericNodeIdRange	NumericRange []	
StaticStringNodeIdPattern	String	

Note: The *IsNamespaceSubset Property* is set to False as the UaNodeSet XML file contains the complete Namespace. *Servers* only exposing a subset of the Namespace need to change the value to True.

19.2 Handling of OPC UA Namespaces

Namespaces are used by OPC UA to create unique identifiers across different naming authorities. The *Attributes NodeId* and *BrowseName* are identifiers. A *Node* in the UA *AddressSpace* is unambiguously identified using a *NodeId*. Unlike *NodeIds*, the *BrowseName* cannot be used to unambiguously identify a *Node*. Different *Nodes* may have the same *BrowseName*. They are used to build a browse path between two *Nodes* or to define a standard *Property*.

Servers may often choose to use the same namespace for the *NodeId* and the *BrowseName*. However, if they want to provide a standard *Property*, its *BrowseName* shall have the namespace of the standards body although the namespace of the *NodeId* reflects something else, for example the *EngineeringUnits Property*. All *NodeIds* of *Nodes* not defined in this document shall not use the standard namespaces.

Table 48 provides a list of mandatory and optional namespaces used in an OPC 40082-6 OPC UA *Server*.

Table 48 – Namespaces used in a OPC 40082-6 Server

NamespaceURI	Description	Use
http://opcfoundation.org/UA/	Namespace for *NodeIds* and *BrowseNames* defined in the OPC UA specification. This namespace shall have namespace index 0.	Mandatory
Local Server URI	Namespace for nodes defined in the local server. This namespace shall have namespace index 1.	Mandatory
http://opcfoundation.org/UA/DI/	Namespace for *NodeIds* and *BrowseNames* defined in OPC 10000-100. The namespace index is *Server* specific.	Mandatory
http://opcfoundation.org/UA/Machinery/	Namespace for *NodeIds* and *BrowseNames* defined in OPC UA for Machinery – Part 1: Basic Building Blocks (OPC 40001-1). The namespace index is *Server* specific.	Mandatory
http://opcfoundation.org/UA/PlasticsRubber/GeneralTypes/	Namespace for *NodeIds* and *BrowseNames* defined in OPC 40083. The namespace index is server specific.	Mandatory
http://opcfoundation.org/UA/PlasticsRubber/GDD/	Namespace for *NodeIds* and *BrowseNames* defined in this document. The namespace index is *Server* specific.	Mandatory
Vendor specific types	A *Server* may provide vendor-specific types like types derived from *ObjectTypes* defined in this document in a vendor-specific namespace.	Optional
Vendor specific instances	A *Server* provides vendor-specific instances of the standard types or vendor-specific instances of vendor-specific types in a vendor-specific namespace. It is recommended to separate vendor specific types and vendor specific instances into two or more namespaces.	Mandatory

Table 49 provides a list of namespaces and their indices used for *BrowseNames* in this document. The default namespace of this document is not listed since all *BrowseNames* without prefix use this default namespace.

Table 49 – Namespaces used in this document

NamespaceURI	Namespace Index	Example
http://opcfoundation.org/UA/	0	0:EngineeringUnits
http://opcfoundation.org/UA/DI/	2	2:DeviceClass
http://opcfoundation.org/UA/Machinery/	3	3:MachineIdentificationType
http://opcfoundation.org/UA/PlasticsRubber/GeneralTypes/	4	4:MachineInformationType

Annex A
(normative)

OPC 40082-6 Namespace and mappings

A.1 NodeSet and supplementary files for OPC 40082-6 Information Model

The OPC 40082-6 *Information Model* is identified by the following URI:

http://opcfoundation.org/UA/PlasticsRubber/GDD/

Documentation for the NamespaceUri can be found here.

The *NodeSet* associated with this version of specification can be found here:

https://reference.opcfoundation.org/nodesets/?u=http://opcfoundation.org/UA/PlasticsRubber/GDD/&v=1.0.0&i=1

The *NodeSet* associated with the latest version of the specification can be found here:

https://reference.opcfoundation.org/nodesets/?u=http://opcfoundation.org/UA/PlasticsRubber/GDD/&i=1

Supplementary files for the OPC 40082-6 *Information Model* can be found here:

https://reference.opcfoundation.org/nodesets/?u=http://opcfoundation.org/UA/PlasticsRubber/GDD/&v=1.0.0&i=2

The files associated with the latest version of the specification can be found here:

https://reference.opcfoundation.org/nodesets/?u=http://opcfoundation.org/UA/PlasticsRubber/GDD/&i=2

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