

OPC 40079 Instance for umati Demonstrator

The namespace for the instances is manufacturer specific, e.g.
http://samplemanufacturer.com/umati_sample_IMM_robot_cell/

For integrating OPC 40079 in the umati demonstrator it is necessary to combine the models for the IMM (injection moulding machine) and the robot in one entry point for the cell. For this an additional model *opc40079forumati.xml* with the ObjectType *ImmRobotCellType* has been created:

Table 1 – ImmRobotCellType Definition

Attribute	Value				
BrowseName	ImmRobotCellType				
IsAbstract	False				
References	Node Class	BrowseName	Data Type	TypeDefinition	Other
Subtype of 0:BaseObjectType defined in OPC 40000-5					
0:HasAddIn	Object	2:Identification		3:MachineIdentificationType	M
0:HasProperty	Variable	ImmManufacturer	0:String	0:PropertyType	M
0:HasProperty	Variable	ImmModel	0:String	0:PropertyType	M
0:HasProperty	Variable	RobotManufacturer	0:String	0:PropertyType	M
0:HasProperty	Variable	RobotModel	0:String	0:PropertyType	M
0:HasComponent	Object	Imm		4:ImmToRobotType	M
0:HasComponent	Object	Robot		4:RobotToImmType	M

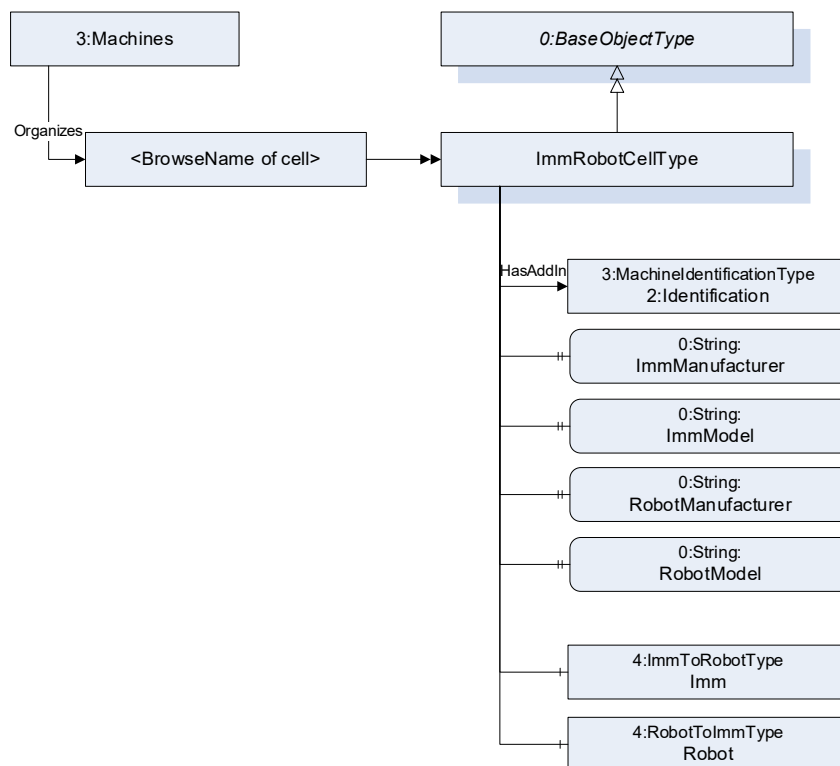


Figure 1 – ImmRobotCellType overview

The *MachinelIdentificationType* is defined in OPC UA for Machinery. It includes basic information about a machine which are displayed in the umati dashboard (manufacturer, serial number, ...). To show the combination of IMM and robot, the cell is handles as one machine for the dashboard. To make the different manufacturers and models of IMM and robot visible in the overview, the variables Manufacturer and Model inside the Identification object shall be filled with both information. Examples:

Identification -> Manufacturer: "KraussMaffei / Kuka"

Identification -> Model: "GX G02 / KR CYBERTECH ARC"

In the detailed view of the cell, the manufacturers and model are displayed separately. For this, the Variables ImmManufacturer, ImmModel, RobotManufacturer and RobotModel are used. It is not required to have separate instances of the *MachinelIdentificationType* for the IMM and the robot.

Table 2 provides a list of namespaces and their index used for *BrowseNames* in this document.

Table 2 – Namespaces used in this document

NamespaceURI	Namespace Index	Example
http://opcfoundation.org/UA/	0	0:NodeVersion
http://opcfoundation.org/UA/PlasticsRubber/umati/	1	<i>Default namespace of this specification → no prefix used, e.g. ImmRobotCellType</i>
http://opcfoundation.org/UA/DI/	2	2:Identification
http://opcfoundation.org/UA/Machinery/	3	3:MachinelIdentificationType
http://opcfoundation.org/UA/PlasticsRubber/ImmToRobot/	4	4:ImmToRobotType

Table 3 shows the complete structure of the instance needed for the umati demonstrator. The demonstrator requires, that all mandatory elements of the *ImmRobotCellType* are existent, even if there are not displayed in the dashboard. If the value of a variable is not displayed, it can be filled with a static dummy value (e.g. empty string). All displayed values are highlighted in light-blue.

Table 3 – Sample instance of ImmRobotCellType

BrowseName	Type	Example Value	Remarks
Objects			
↳ Machines			
↳ <BrowseNameOfCell>	ImmRobotCellType		
↳ 2:Identification	4:MachineIdentificationType		
– 2:ProductInstanceUri		"http://samplemanufacturer.com/Cell 123"	1)
– 2:Manufacturer	0:LocalizedText	"Sample IMM Manufacturer / Sample Robot Manufacturer"	
– 2:Model	0:LocalizedText	"Machine Model 3000 / Robot 99"	2)
– 2:SerialNumber	0:String	"Cell123"	1)
– 4:Location	0:String	"K 14 F42/N 51.260407 E 6.744588"	2), 3)
– ImmManufacturer	0:String	"Sample IMM Manufacturer"	
– ImmModel	0:String	"Machine Model 3000"	
– RobotManufacturer	0:String	"Sample Robot Manufacturer"	
– RobotModel	0:String	"Robot 99"	
↳ Imm	4:ImmToRobotType		
– 4:EndOfOrder	0:Boolean	false	1)
– 4:ImmOperationActive	0:Boolean	true	1)
– 4:PrepareForOperationWithImm	0:Boolean	true	1)
– 4:RobotMessageId_confirmed	0:UInt32	587	
↳ Mould_1	4:MouldType		
– 0:NodeVersion	0:String	"1"	1)
↳ 4:MovablePlaten	4:ImmAxisType		
– 4:InPosition1	0:Boolean	false	
– 4:InPosition2	0:Boolean	true	
– 4:Movement	4:MovementEnum	0 (=NOT_MOVING)	
↳ Robot	4:RobotToImmType		
– 4:OperationWithImmRequested	0:Boolean	true	1)
– 4:OperationWithImmActive	0:Boolean	true	
– 4:ReadyForOperationWithImm	0:Boolean	true	1)
– 4:RobotMessageId	0:UInt32	587	
↳ MouldInteraction_1	4:MouldInteractionType		
– 4:MouldAreaFree	0:Boolean	true	
↳ 4:EnableMovablePlaten	4:EnableImmAxisType		
– 4:RelevantForInteraction	0:Boolean	true	1)
– 4:EnableToPosition1	0:Boolean	true	
– 4:EnableToPosition2	0:Boolean	true	

- 1) This variable is mandatory in the model but will not be displayed in the demonstrator
- 2) Not mandatory in OPC UA for Machinery but for this model and will be displayed in the demonstrator
- 3) See <https://showcase.umatl.org/Dashboard.html#location-of-fair-machine-and-software-icons-on-the-dashboard> for rules for filling the location.