

THE HUB[®] SOFTWARE

OPC UA SERVER GUIDE



RJG
MOLD SMART

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The Hub[®] Software OPC UA Server

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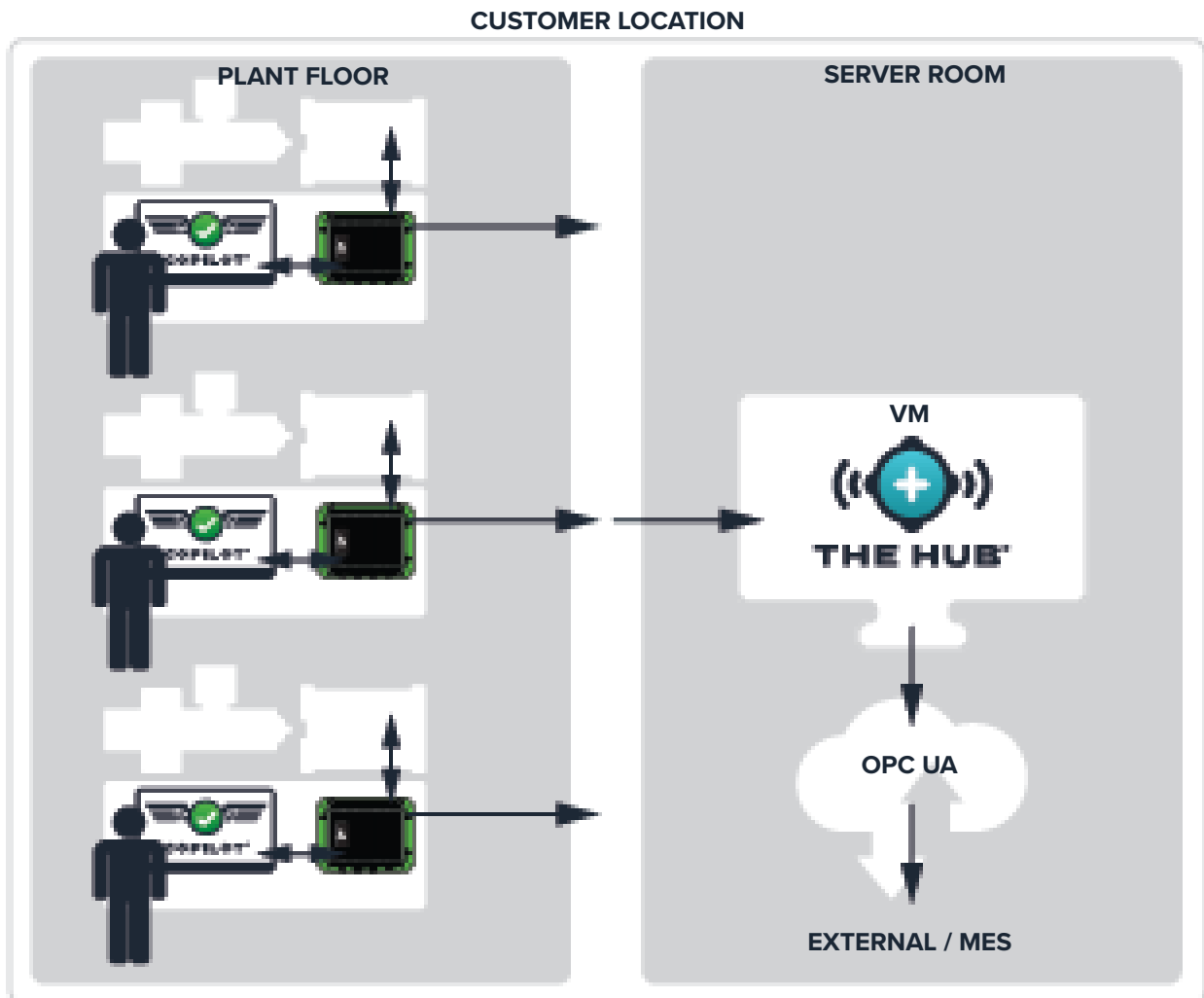


The Hub[®] Software OPC UA Server

OVERVIEW

The Hub[®] software Open Platform Communications Unified Architecture (OPC UA) server facilitates the transfer of RJG job information, summary variables, and alarm changes from The Hub software to a Manufacturing Execution System (MES) using Transmission Control Protocol (TCP) communication.

The Hub OPC UA server data model adheres to OPC UA and EUROMAP standards. The illustration below maps the path of data travel from the CoPilot system, to The Hub software, to the OPC UA server, and finally, to the external systems/MES.





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REQUIREMENTS

The Hub OPC UA access is a separately-licensed feature available for addition to The Hub software. RJG customer support will provide the The Hub OPC UA license key to the customer, or will work with the customer to update their license key to activate the feature on The Hub software.

Only users with OPC UA permissions in The Hub are able to access the OPC UA server; refer to The Hub® Software User Guide for all The Hub user roles and permissions.

Additionally, the customer-selected OPC UA client will require an IP address and two ports available for OPC UA. The default limits for the selected OPC UA Server are as follows:

`receive_buffer_size = 131072`

`send_buffer_size = 131072`

The use of Prosys and Matrikon will not require additional configuration; other OPC UA clients may require configuration as follows:

Endpoint URL: `opc.tcp://<IP>:4855`

Example Configuration Using UAExpert: Settings/Configure UAExpert

`Stack.TcpConnection_DefaultChunkSize: 131072`





The Hub[®] Software OPC UA Server

JOB INFORMATION

The Hub software OPC UA server supplies job information collected from the connected CoPilot systems once per cycle, in realtime. The following data is provided:

JOB INFORMATION

Machine Name	CoPilot Serial Number
Mold Name	CoPilot IP Address
Process Name	CoPilot Software Version

CYCLE INFORMATION AND COUNTS

Alarm State	Reject Cycles
Down Time	Reject Percent
Down Time Percent	Run Time
Good Cycles	Sort State
Last Cycle Time	Standard Cycle Time
Machine Match	Suspect Cycles
Machine State	Total Cycles
Material Match	Unique Cycle ID
Mold Match	





The Hub[®] Software OPC UA Server

JOB INFORMATION (CONTINUED)

SUMMARY VARIABLES

Average Cavity Fill Time	Hold Pressure
Average Flow Rate	Hold Time
Average Peak Pressure	Injection Integral
Average Temperature	Melt Temperature
Back Pressure	Minimum Temperature
Balance Cavity Fill Time	Part Out Time
Balance Peak	Peak Mold Deflection
Cavity Fill Time	Peak Pressure
Cooling Rate	Peak Temperature
Cooling Time	Process Fill Time
Cushion	Process Pack Time
Cycle Integral	Recovery Time
Cycle Time	RJG Shot Size
Decompress	RJG Transfer
Delta Average Cavity Fill Time	Shot Size
Effective Shot Size	Temperature Rise
Effective Viscosity	Temperature Out Peak Integral
Fill Only Weight	Temperature Out Peak Time
Fill Pressure	Transfer
Fill Time	Water Temperature A Half
Final Part Weight	Water Temperature B Half

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JOB INFORMATION (CONTINUED)

ALARM LIMITS, CHANGES, AND EVENTS

Alarm Above	Alarm Error
Alarm Lower Limits	Alarm Nominal
Alarm Lower Limits Changes	Warning Above
Alarm Upper Limits	Warning Below
Alarm Upper Limits Changes	Warning Error
Alarm Below	Warning Nominal





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DATA IN OPC UA EUROMAP FORMAT

MACHINE

NAMESPACE

Namespace			7
NodeId	Numeric		1005
Name	Machine		
BrowseName	1:Machine		
DisplayName	Machine		
NodeClass	Object Type	Nodeset definition	
Parent	BaseObjectType	Reference documentation	

NODESET

Name	CoPilotInformationType	RJGActiveCyclicValuesType	RJGJobInformationType	RJGInjectionUnitCycleParametersType
Browse Name	1:CoPilotInformationType	1:RJGActiveCyclicValuesType	1:RJGJobInformationType	1:RJGInjectionUnitCycleParametersType
RJG Name	CoPilot	Cycle Values	Job Information	Summary Variables
Display Name	CoPilotInformationType	RJGActiveCyclicValuesType	RJGJobInformationType	RJGInjectionUnitCycleParametersType
Node Class	Object			
Data Type				
Type Definition	7:CoPilotInformationType	7:RJGActiveCyclicValuesType	7:RJGJobInformationType	7:RJGInjectionUnitCycleParametersType
Description		Additional information on the running job for cyclic production		

Indicates RJG-Provided Values (NOT EUROMAP)





The Hub[®] Software OPC UA Server

DATA IN OPC UA EUROMAP FORMAT (CONTINUED)

COPILOT SYSTEM

NAMESPACE

Namespace		7
NodeId	Numeric	1008
Name	CoPilotInformation	
BrowseName	1:CoPilotInformation	
DisplayName	CoPilotInformation	
NodeClass	Object Type	
Parent	BaseObjectType	

NODESET

Name	Gateway	IPAddress	Key	MAC Address	Netmask	Serial Number	Version
Browse Name	1:Gateway	1:IPAddress	1:Key	1:MAC Address	1:Netmask	1:SerialNumber	1:Version
Display Name	Gateway	IPAddress	Key	MACAddress	Netmask	SerialNumber	Version
Node Class	Variable						
Data Type	0:String						
Type Definition	0:BaseDataVariable Type						
Description			Unique key identifying a CoPilot system Managed by The Hub software.				

Indicates RJG-Provided Values (NOT EUROMAP)





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DATA IN OPC UA EUROMAP FORMAT (CONTINUED)

CYCLIC JOB INFORMATION

NAMESPACE

Namespace		7
NodeId	Numeric	1007
Name	RJGCyclicJobInformationType	
BrowseName	1:RJGCyclicJobInformationType	
DisplayName	RJGCyclicJobInformationType	
NodeClass	Object Type	Nodeset definition https://reference.opcfoundation.org/nodesets/58/19519
Parent	CyclicJobInformationType	Reference documentation https://reference.opcfoundation.org/PlasticsRubber/GeneralTypes/v103/docs/18.2.11

NODESET

Name	Machine Name	Mold Name	Process Name	Expected Cycle Time
Browse Name	1:MachineName	1:MoldName	1:ProcessName	1:ExpectedCycleTime
Display Name	MachineName	MoldName	ProcessName	ExpectedCycleTime
Node Class	Variable			
Data Type	0:String		0:Duration	
Type Definition	0:PropertyType			
Description				Calculated cycle time for the job

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DATA IN OPC UA EUROMAP FORMAT (CONTINUED)

SUMMARY VARIABLE ALARM TYPES

NAMESPACE

Namespace		7
NodeId	Numeric	3003
Name	SummaryVariableAlarmType	
BrowseName	7:SummaryVariableAlarmType	
DisplayName	SummaryVariableAlarmType	
NodeClass	Data Type	Nodeset definition https://reference.opcfoundation.org/nodesets/2/16283
Parent	Structure	Reference documentation https://reference.opcfoundation.org/v105/Core/docs/Part5/12.2.12

NODESET

Name	Tag	Profile	LowLimit	Nominal	HighLimit	Alarm-Count-Above	Alarm-Count-Below	Warning-Count-Above	Warning-Count-Below	ErrorCount
Symbolic Name	Tag	Profile	LowLimit	Nominal	HighLimit	Alarm-Count-Above	Alarm-Count-Below	Warning-Count-Above	Warning-Count-Below	ErrorCount
Display Name	Tag	Profile	LowLimit	Nominal	HighLimit	Alarm-Count-Above	Alarm-Count-Below	Warning-Count-Above	Warning-Count-Below	ErrorCount
RJGName	Alarm Type		Lower Limit		Upper Limit					
Type	String	String	DataValue	DataValue	DataValue	UInt64	UInt64	UInt64	UInt64	UInt64
Note			Instances may set a more specific type as needed.							

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The Hub[®] Software OPC UA Server

DATA IN OPC UA EUROMAP FORMAT (CONTINUED)

CYCLE VALUES

NAMESPACE

Namespace		7
NodeId	Numeric	1003
Name	RJGActiveCyclicJobValuesType	
BrowseName	7:RJGActiveCyclicJobValuesType	
DisplayName	RJGActiveCyclicJobValuesType	
NodeClass	Object Type	Nodeset definition https://reference.opcfoundation.org/nodesets/58/19479
Parent	ActiveCyclicJobValuesType	Reference documentation https://reference.opcfoundation.org/PlasticsRubber/GeneralTypes/v103/docs/18.4.7

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DATA IN OPC UA EUROMAP FORMAT (CONTINUED)

NODESET

Name	BrowseName	DisplayName	NodeClass	DataType	TypeDefinition	Description
AlarmState	1:AlarmState	AlarmState	Variable	0:String	0:BaseDataVariableType	
CurrentLotName	1:CurrentLotName	CurrentLotName	Variable	0:String	0:PropertyType	Name of the current production lot
DownTime	1:DownTime	DownTime	Variable	0:Duration		
JobAlarmCycleCounter	1:JobAlarmCycleCounter	JobAlarmCycleCounter	Variable	0:UInt64	0:BaseDataVariableType	
JobBadCycleCounter	1:JobBadCycleCounter	JobBadCycleCounter	Variable	0:UInt64	0:BaseDataVariableType	
JobBadPartsCycleCounter	1:JobBadPartsCycleCounter	JobBadPartsCycleCounter	Variable	0:UInt64	0:BaseDataVariableType	Number of bad parts produced in the current job
JobCycleCounter	1:JobCycleCounter	JobCycleCounter	Variable	0:UInt64	0:BaseDataVariableType	Number of finished cycles in the job
JobGoodCyclesCounter	1:JobGoodCyclesCounter	JobGoodCyclesCounter	Variable	0:UInt64	0:BaseDataVariableType	
JobGoodPartsCounter	1:JobGoodPartsCounter	JobGoodPartsCounter	Variable	0:UInt64	0:BaseDataVariableType	Number of good parts produced in the current job
JobMaterialCycleCounter	1:JobMaterialCycleCounter	JobMaterialCycleCounter	Variable	0:UInt64	0:BaseDataVariableType	
JobOverCycleTimeCounter	1:JobOverCycleTimeCounter	JobOverCycleTimeCounter	Variable	0:UInt64	0:BaseDataVariableType	
JobPartsCounter	1:JobPartsCounter	JobPartsCounter	Variable	0:UInt64	0:BaseDataVariableType	Total number of parts produced in the current job
JobStartTime	1:JobStartTime	JobStartTime	Variable	0:DateTime	0:BaseDataVariableType	
JobStatus	1:JobStatus	JobStatus	Variable	1:JobStatusEnumeration	0:BaseDataVariableType	Current status of the job
JobTestSamplesCounter	1:JobTestSamplesCounter	JobTestSamplesCounter	Variable	0:UInt64	0:BaseDataVariableType	Number of test sample parts produced in the current job
JobWarningCycleCounter	1:JobWarningCycleCounter	JobWarningCycleCounter	Variable	0:UInt64	0:BaseDataVariableType	
LastCycleTime	1:LastCycleTime	LastCycleTime	Variable	0:Duration	0:BaseDataVariableType	Time of the recently finished cycle
MachineMatch	1:MachineMatch	MachineMatch	Variable	0:String	0:BaseDataVariableType	
MachineState	1:MachineState	MachineState	Variable	0:String	0:BaseDataVariableType	
MachineStatus	1:MachineStatus	MachineStatus	Variable	0:String	0:BaseDataVariableType	
Manual	1:Manual	Manual	Variable	0:Boolean	0:BaseDataVariableType	
MaterialMatch	1:MaterialMatch	MaterialMatch	Variable	0:String	0:BaseDataVariableType	
MoldMatch	1:MoldMatch	MoldMatch	Variable	0:String	0:BaseDataVariableType	
SortState	1:SortState	SortState	Variable	0:String	0:BaseDataVariableType	
Timestamp	1:Timestamp	Timestamp	Variable	0:DateTime	0:BaseDataVariableType	

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The Hub[®] Software OPC UA Server

DATA IN OPC UA EUROMAP FORMAT (CONTINUED)

SUMMARY VARIABLES

NAMESPACE

Namespace		7
Nodetid	Numeric	1004
Name	RJGInjectionUnitCycleParametersType	
BrowseName	1:RJGInjectionUnitCycleParametersType	
DisplayName	RJGInjectionUnitCycleParametersType	
NodeClass	Object Type	Nodeset definition https://reference.opcfoundation.org/nodesets/62/19650
Parent	InjectionUnitCycleParametersType	Reference documentation https://reference.opcfoundation.org/PlasticsRubber/IMM2MES/v101/docs/17.3

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DATA IN OPC UA EUROMAP FORMAT (CONTINUED)

NODESET

Name	BrowseName	DisplayName	RJG Name	NodeClass	Data Type	Type Definition	Description
BackPressure	1:BackPressure	BackPressure	Back Pressure	Variable	0:Double	0:RJGAnalogItem	Back pressure is the melt-pressure against the screw movement during dosage
CavityFillTimeAverage	1:CavityFillTimeAverage	CavityFillTimeAverage	Average Cavity Fill Time	Variable	0:Double	0:RJGAnalogItem	Average cavity fill time
CavityFillTimeBalance	1:CavityFillTimeBalance	CavityFillTimeBalance	Balance Cavity Fill Time	Variable	0:Double	0:RJGAnalogItem	
CavityFillTimeDeltaAverage	1:CavityFillTimeDeltaAverage	CavityFillTimeDeltaAverage	Delta Average Cavity Fill Time	Variable	0:Double	0:RJGAnalogItem	
CoolingTime	1:CoolingTime	CoolingTime	Cooling Time	Variable	0:Double	0:RJGAnalogItem	
DecompressionVolumeBeforePlastification	1:DecompressionVolumeBeforePlastification	DecompressionVolumeBeforePlastification	Decompress	Variable	0:Double	0:RJGAnalogItem	Decompression before plastification is the movement of the screw in the opposite direction to injection
DosingTime	1:DosingTime	Dosing Time	Recovery Time	Variable	0:Duration	0:RJGAnalogItem	Time to melt the plastic granulates and feed the melt for the next injection shot to the front of the screw
FlowIndex	1:FlowIndex	FlowIndex	EffectiveViscosity	Variable	0:Double	0:RJGAnalogItem	Flow index
HoldSpecificPressureMaximum	1:HoldSpecificPressureMaximum	HoldSpecificPressureMaximum	Hold Pressure	Variable	0:Double	0:RJGAnalogItem	Maximum holding pressure in front of the screw
HoldTime	1:HoldTime	HoldTime	Hold Time	Variable	0:Double	0:RJGAnalogItem	
InjectionTime	1:InjectionTime	InjectionTime	FillTime	Variable	0:Duration	0:RJGAnalogItem	Time required to fill the cavity or mould
PartOutTime	1:PartOutTime	PartOutTime	Part Out Time	Variable	0:Double	0:RJGAnalogItem	
PressurePeak	1:PressurePeak	PressurePeak	PeakPressure	Variable	0:Double	0:RJGAnalogItem	
ProcessFillTime	1:ProcessFillTime	ProcessFillTime	Process Fill Time	Variable	0:Double	0:RJGAnalogItem	
ShotSizeEffective	1:ShotSizeEffective	ShotSizeEffective	Effective Shot Size	Variable	0:Double	0:RJGAnalogItem	
ShotSizeRJG	1:ShotSizeRJG	ShotSizeRJG	RJG Shot Size	Variable	0:Double	0:RJGAnalogItem	
SpecificPressureMaximum	1:SpecificPressureMaximum	SpecificPressureMaximum	Fill Pressure Plastic Pressure	Variable	0:Double	0:RJGAnalogItem	Pressure in front of the screw tip
TimeToPeak	1:TimeToPeak	TimeToPeak	Fill & Pack Time	Variable	0:Double	0:RJGAnalogItem	
Transfer	1:Transfer	Transfer	Transfer	Variable	0:Double	0:RJGAnalogItem	
TransferRJG	1:TransferRJG	TransferRJG	RJG Transfer	Variable	0:Double	0:RJGAnalogItem	
TransferStroke	1:TransferStroke	TransferStroke	Transfer, Stroke Length	Variable	0:Double	0:RJGAnalogItem	Switch-over point to the holding pressure via stroke
TransferVolume	1:TransferVolume	TransferVolume	Transfer, Stroke Volume	Variable	0:Double	0:RJGAnalogItem	Switch-over point to the holding pressure via volume

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The Hub[®] Software OPC UA Server

DATA IN OPC UA EUROMAP FORMAT (CONTINUED)

SUMMARY VARIABLE ALARM VARIABLE TYPES

NAMESPACE

Namespace		7
NodeId	Numeric	2001
Name	SummaryVariableAlarmVariableType	
BrowseName	7:SummaryVariableAlarmVariableType	
DisplayName	SummaryVariableAlarmVariableType	
NodeClass	Data Type	Nodeset definition https://reference.opcfoundation.org/nodesets/2/16317
Parent	Structure	Reference documentation https://reference.opcfoundation.org/v105/Core/docs/Part5/7.4

NODESET

Name	Tag	Profile	LowLimit	Nominal	HighLimit	Alarm-Count-Above	Alarm-Count-Below	Warning-Count-Above	Warning-Count-Below	ErrorCount
NodeId	7:6303	7:6304	7:6305	7:6380	7:6381	7:6091	7:6081	7:6082	7:6083	7:6090
Browse Name	7:Tag	7:Profile	7:LowLimit	7:Nominal	7:HighLimit	7:Alarm-Count-Above	7:Alarm-Count-Below	7:Warning-Count-Above	7:Warning-Count-Below	7:ErrorCount
Display Name	Tag	Profile	LowLimit	Nominal	HighLimit	Alarm-Count-Above	Alarm-Count-Below	Warning-Count-Above	Warning-Count-Below	ErrorCount
RJGName	Alarm Type		Lower Limit		Upper Limit					
Node Class	Variable									
Data Type	0:String	0:String	0:Number	0:Number	0:Number	0:UInt64	0:UInt64	0:UInt64	0:UInt64	0:UInt64
TypeDefinition	0:BaseDataVariableType		0:BaseAnalogType			0:BaseDataVariableType				
Notes										

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The Hub[®] Software OPC UA Server

DATA IN OPC UA EUROMAP FORMAT (CONTINUED)

RJG ANALOG ITEM TYPE

NAMESPACE

Namespace		7
NodeId	Numeric	2003
Name	RJGAnalogItemType	
BrowseName	7:RJGAnalogItemType	
DisplayName	RJGAnalogItemType	
NodeClass	Variable	Nodeset definition https://reference.opcfoundation.org/nodesets/2/16548
Parent	AnalogItemType	Reference documentation https://reference.opcfoundation.org/v105/Core/docs/Part8/5.3.2/

NODESET

Name	EngineeringUnits	EURange [†]	SummaryVariableAlarm
Symbolic Name	1:EngineeringUnits	1:EURange	1:SummaryVariableAlarm
Display Name	EngineeringUnits	EURange	SummaryVariableAlarm
RJGName	Alarm Type		Lower Limit
Node Class	Variable		
Data Type	0:Double		
TypeDefinition	0:AnalogItemType		

[†]currently unused





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