

## Product Description

Nexto Series programmable controllers are the ultimate solution for industrial automation and system control. With high embedded technology, the products of the family are able to control, in a distributed and redundant way, complex industrial systems, machines, high performance production lines and the most advanced processes of Industry 4.0. Modern and high-speed, the Nexto series uses cutting-edge technology to provide reliability and connectivity, helping to increase the productivity of different businesses.

Compact, robust and with high availability, the series products have excellent processing performance and rack expansion possibilities. Its architecture allows easy integration with supervision, control and field networks, in addition to CPU and power supply redundancy. The family's equipment also offers advanced diagnostics and hot swapping, minimizing or eliminating maintenance downtime and ensuring a continuous production process.



Its main features are:

- Up to 32 Kbytes of %I points and 32 Kbytes of %Q points
- Large memory capacity for user application and user data
- Up to 7,5 Kbytes of retain or persistent memory
- High-speed 32-bit processing
- Floating point unit
- 1 serial ports
- 1 Ethernet interfaces at front panel
- Enhanced diagnostics services
- System messages log
- OPC DA/UA, IEC 60870-5-104, PROFINET, SNMP and EtherNet/IP protocols
- Support clock synchronization via SNTP or via IEC 60870-5-104
- Web server features
- Integrated power supply
- One Touch Diag
- IEC 61131-3 compliant
- Real-time clock (RTC)
- Compact and modern design
- Free of moving parts (fans, active cooling, etc.)

## Ordering Information

### Included Items

The product package contains the following items:

- NX3005 module
- 6-terminal connector with fixing
- Installation guide

### Product Code

The following code should be used to purchase the product:

Code	Description
NX3005	CPU, 1 Ethernet port, 1 serial channel, remote rack expansion support, power supply integrated and user web pages support

Table 1: Product Code

## Related Products

The following products must be purchased separately when necessary:

Code	Description
MT8500	MasterTool IEC XE
AL-2600	RS-485 network branch and terminator
AL-2306	RS-485 cable for MODBUS or CAN network
AL-2319	RJ45-RJ45 Cable
AL-1763	CMDB9-Terminal Block Cable
NX9202	RJ45-RJ45 2 m Cable
NX9205	RJ45-RJ45 5 m Cable
NX9210	RJ45-RJ45 10 m Cable
NX9404	6-terminal connector with fixing
NX9020	2-Slot base for panel assembly
NX9000	8-Slot Backplane Rack
NX9001	12-Slot Backplane Rack
NX9002	16-Slot Backplane Rack
NX9003	24-Slot Backplane Rack
NX9010	8-Slot Backplane Rack (No Hot Swap)

Table 2: Related Products

#### Notes:

**MT8500:** MasterTool IEC XE is available in four different versions: LITE, BASIC, PROFESSIONAL and ADVANCED. For more details, please check MasterTool IEC XE User Manual - MU299609.

**AL-2600:** This module is used for branch and termination of RS-422/485 networks. For each network node, an AL-2600 is required. The AL-2600 that is at the ends of network must be configured with termination, except when there is a device with active internal termination, the rest must be configured without termination.

**AL-2306:** Two shielded twisted pairs cable without connectors, used for networks based on RS-485 or CAN.

**AL-2319:** Two RJ45 connectors for programming the CPUs of the Nexto Series and Ethernet point-to-point with another device with Ethernet interface communication.

**AL-1763:** Cable with one DB9 male connector and terminal block for communication between CPUs of the Nexto Series and products with RS-485/RS-422 standard terminal block.

**NX9202/NX9205/NX9210:** Cables used for Ethernet communication and to interconnect the bus expansion modules.

**NX9404:** 6 terminal connector.

**NX9020:** 2 slot base for panel assembly.

## Innovative Features

Nexto Series brings to the user many innovations regarding utilization, supervision and system maintenance. These features were developed focusing a new concept in industrial automation.



**Battery Free Operation:** Nexto Series does not require any kind of battery for memory maintenance and real time clock operation. This feature is extremely important because it reduces the system maintenance needs and allows the use in remote locations where maintenance can be difficult to be performed. Besides, this feature is environmentally friendly.



**Easy Plug System:** Nexto Series has an exclusive method to plug and unplug I/O terminal blocks. The terminal blocks can be easily removed with a single movement and with no special tools. In order to plug the terminal block back to the module, the frontal cover assists the installation procedure, fitting the terminal block to the module.



**Multiple Block Storage:** Several kinds of memories are available to the user in Nexto Series CPUs, offering the best option for any user needs. These memories are divided in volatile memories and non-volatile memories. For volatile memories, Nexto Series CPUs offer addressable input (%I), addressable output (%Q), addressable memory (%M), data memory and redundant data memory. For applications that require non-volatile functionality, Nexto Series CPUs bring retain addressable memory (%Q), retain data memory, persistent addressable memory (%Q), persistent data memory, program memory, source code memory, CPU file system (doc, PDF, data) and memory card interface.



**One Touch Diag:** One Touch Diag is an exclusive feature that Nexto Series brings to PLCs. With this new concept, the user can check diagnostic information of any module present in the system directly on CPU's graphic display with one single press in the diagnostic switch of the respective module. OTD is a powerful diagnostic tool that can be used offline (without supervisor or programmer), reducing maintenance and commissioning times.

**OFD – On Board Full Documentation:** Nexto Series CPUs are capable of storing the complete project documentation in its own memory. This feature can be very convenient for backup purposes and maintenance, since the complete information is stored in a single and reliable place.

**ETD – Electronic Tag on Display:** Another exclusive feature that Nexto Series brings to PLCs is the Electronic Tag on Display. This new functionality brings the process of checking the tag names of any I/O pin or module used in the system directly to the CPU's graphic display. Along with this information, the user can check the description, as well. This feature is extremely useful during maintenance and troubleshooting procedures.

**DHW – Double Hardware Width:** Nexto Series modules were designed to save space in user cabinets or machines. For this reason, Nexto Series delivers two different module widths: Double Width (two backplane rack slots are required) and Single Width (only one backplane rack slot is required). This concept allows the use of compact I/O modules with a high-density of I/O points along with complex modules, like CPUs, fieldbus masters and power supply modules.

**High-speed CPU:** All Nexto Series CPUs were designed to provide an outstanding performance to the user, allowing the coverage of a large range of applications requirements.



**iF Product Design Award 2012:** Nexto Series was the winner of iF Product Design Award 2012 in industry + skilled trades group. This award is recognized internationally as a seal of quality and excellence, considered the Oscars of the design in Europe.

## Product Features

### Common General Features

	NX3005
<b>Backplane rack occupation</b>	2 sequential slots
<b>Power supply integrated</b>	Yes
<b>Ethernet TCP/IP local interface</b>	1
<b>Serial Interface</b>	1
<b>CAN Interface</b>	No
<b>USB Port Host</b>	No
<b>Memory Card Interface</b>	No
<b>Real time clock (RTC)</b>	Yes Resolution of 1 ms and maximum variance of 2 s per day.
<b>Watchdog</b>	Yes
<b>Status and diagnostic Indication</b>	Graphic display LEDs Web pages CPU internal memory
<b>Programming languages</b>	Structured Text (ST) Ladder Diagram (LD) Sequential Function Chart (SFC) Function Block Diagram (FBD) Continuous Function Chart (CFC)
<b>Tasks</b>	Cyclic (periodic) Event (software interruption) External (hardware interruption) Freewheeling (continuous) Status (software interruption)
<b>Online changes</b>	Yes
<b>Maximum number of tasks</b>	16
<b>Maximum number of expansion bus</b>	4
<b>Bus expansion redundancy support</b>	Yes
<b>Maximum number of I/O modules on the bus</b>	64
<b>Maximum number of additional Ethernet TCP/IP interface modules</b>	1
<b>Ethernet TCP/IP interface redundancy support</b>	No
<b>Maximum number of PROFIBUS-DP network (using master modules PROFIBUS-DP)</b>	1
<b>PROFIBUS-DP network redundancy support</b>	No
<b>Redundancy support (half-clusters)</b>	No
<b>Hot Swap support</b>	Yes
<b>Event oriented data reporting (SOE)</b>	No
<b>Protocol</b>	-
<b>Maximum Event Queue Size</b>	-
<b>Web pages development (available through the HTTP protocol)</b>	Yes
<b>One Touch Diag (OTD)</b>	Yes





	NX3005
<b>Electronic Tag on Display (ETD)</b>	Yes
<b>Standards</b>	
IEC 61131-3	Yes
DNV-GL Type Approval – DNVGL-CG-0339 (TAA000013D)	Yes
IEC 61131-2	Yes
 CE – 2014/35/EU (LVD) and 2014/30/EU (EMC)	Yes
 RoHS RoHS – 2011/65/EU	Yes
 LISTED UL Listed – UL61010-1 (file E473496)	Yes
 EAC EAC – CU TR 004/2011 (LVD) and CU TR 020/2011 (EMC)	Yes

Table 3: Common Features

**Notes:**

**Real Time Clock (RTC):** The retention time, time that the real time clock will continue to update the date and time after a CPU power down, is 15 days for operation at 25 °C. At the maximum product temperature, the retention time is reduced to 10 days.

**Maximum number of I/O modules on bus:** The maximum number of I/O modules refers to the sum of all modules on the local bus and expansions.

**Memory**

	NX3005
<b>Addressable input variables memory (%I)</b>	32 Kbytes
<b>Addressable output variables memory (%Q)</b>	32 Kbytes
<b>Direct representation variable memory (%M)</b>	16 Kbytes
<b>Symbolic variable memory</b>	3 Mbytes
<b>Maximum amount of memory configurable as retentive or persistent</b>	7.5 Kbytes
<b>Full Redundant Data Memory</b>	-
<b>Direct representation input variable memory (%I)</b>	-
<b>Direct representation output variable memory (%Q)</b>	-
<b>Direct representation variable memory (%M)</b>	-
<b>Symbolic variable memory</b>	-
<b>Program memory</b>	6 Mbytes

	NX3005
Source code memory (backup)	40 Mbytes
User files memory	16 Mbytes

Table 4: Memory

## Protocols

	NX3005	Interface
Open Protocol	Yes	COM1
MODBUS RTU Master	Yes	COM1
MODBUS RTU Slave	Yes	COM1
MODBUS TCP Client	Yes	NET1
MODBUS TCP Server	Yes	NET1
MODBUS RTU via TCP Client	Yes	NET1
MODBUS RTU via TCP Server	Yes	NET1
CANopen Master	No	-
CANopen Slave	No	-
CAN low level	No	-
SAE J-1939	No	-
OPC DA Server	Yes	NET1
OPC UA Server	Yes	NET1
EtherCAT Master	No	-
SNMP Agent	Yes	NET1
DNP3 Server (Event-oriented data)	No	-
IEC 60870-5-104 Server	Yes	NET1
EtherNet/IP Scanner	Yes	NET1
EtherNet/IP Adapter	Yes	NET1
MQTT Client	Yes	NET1
SNTP Client (for clock synchronism)	Yes	NET1
PROFINET Controller	Yes	NET1
PROFINET Device	No	-

Table 5: Protocols

**Note:**

**PROFINET Controller:** Enabled for use on a simple (not ring) network with up to 8 devices. For larger applications, consult technical support.

## Serial Interface

### COM 1


		COM 1
<b>Connector</b>		Shielded female DB9
<b>Physical interface</b>		RS-422 or RS-485 (depending on the selected cable)
<b>Communication direction</b>		RS-422: full duplex RS-485: half duplex
<b>RS-422 maximum transceivers</b>		11 (1 transmitter and 10 receivers)
<b>RS-485 maximum transceivers</b>		32
<b>Termination</b>		Yes (optional via cable selection)
<b>Baud rate</b>		200, 300, 600, 1200, 1800, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
<b>Isolation</b>		
<b>Logic to Serial Port</b>		1000 Vac / 1 minute
<b>Serial Port to protection earth</b> 		1000 Vac / 1 minute

Table 6: COM 1 Serial Interface Features

**Notes:**

**Physical Interface:** Depending on configuration of the used cable, it is possible to choose the kind of physical interface: RS-422 or RS-485. The list of cables can be found at [Related Products](#) section.

**RS-422 Maximum Transceivers:** It is the maximum number of RS-422 transceivers that can be used on a same bus.

**RS-485 Maximum Transceivers:** It is the maximum number of RS-485 transceivers that can be used on a same bus.

## Ethernet interface

### NET 1

	NET 1
<b>Connector</b>	Shielded female RJ45
<b>Auto crossover</b>	Yes
<b>Maximum cable length</b>	100 m
<b>Cable type</b>	UTP or ScTP, category 5
<b>Baud rate</b>	10/100 Mbps
<b>Physical layer</b>	10/100 BASE-TX (Full Duplex)
<b>Data link layer</b>	LLC (Logical Link Control)
<b>Network layer</b>	IP (Internet Protocol))
<b>Transport layer</b>	TCP (Transmission Control Protocol) UDP (User Datagram Protocol)
<b>Diagnostic</b>	LEDs - green (speed), yellow (link/activity)
<b>Isolation</b> Ethernet interface to Se- rial Port	1500 Vac / 1 minute

Table 7: Ethernet NET 1 Interface Features

## Environmental Characteristics

	NX3005
<b>Current consumption on the power supply rail</b>	-
<b>Dissipation</b>	4 W
<b>Operating temperature</b>	0 to 60 °C
<b>Storage temperature</b>	-25 to 75 °C
<b>Relative humidity</b>	5% to 96%, non-condensing
<b>Conformal coating</b>	Yes
<b>IP Level</b>	IP 20
<b>Module dimensions (W x H x D)</b>	36,00 x 114,63 x 115,30 mm
<b>Package dimensions (W x H x D)</b>	44,00 x 122,00 x 147,00 mm
<b>Weight</b>	350 g
<b>Weight with package</b>	400 g

Table 8: Environmental Characteristics

### Notes:

**Conformal coating of electronic circuits:** The covering of electronic circuits protects internal parts of the product against moisture, dust and other harsh elements to electronic circuits.

## Power Supply

Power Supply	
Nominal input voltage	24 Vdc
Maximum output power	15 W
Maximum output current	3 A
Input voltage	19.2 to 30 Vdc
Maximum input current (in-rush)	30 A
Maximum input current	1.4 A
Maximum input voltage interrupt time	10 ms @ 24 Vdc
Isolation	
Input to logic	1000 Vac / 1 minute
Input to protective earth ⊖	1500 Vac / 1 minute
Input to functional earth ⏏	1000 Vac / 1 minute
Cross section	0.5 mm <sup>2</sup>
Polarity inversion protection	Yes
Internal auto recovery fuse	Yes
Output short-circuit protection	Yes
Overcurrent protection	Yes

Table 9: Power Supply Features

**Note:**

**Maximum output power:** Using modules I/O NextoJet, you can extend and get to use 20 W of power output. See Application Note NAP152 to meet the restrictions to use this limit.

## Performance

Instruction	Language	Variables	Instruction Times ( $\mu$ s)
<b>1000 Contacts</b>	LD	BOOL	6
<b>1000 Divisions</b>	ST	INT	43
		REAL	81
	LD	INT	43
		REAL	81
<b>1000 Multiplications</b>	ST	INT	15
		REAL	23
	LD	INT	15
		REAL	23
<b>1000 Sums</b>	ST	INT	15
		REAL	23
	LD	INT	15
		REAL	23
<b>1000 PID</b>	ST	REAL	< 5000

Table 10: Instruction Times

## Compatibility with Other Products

To develop an application for Nexto Series CPUs, it is necessary to check the version of MasterTool IEC XE. The following table shows the minimum version required (where the controllers were introduced) and the respective firmware version at that time:

Nexto Series CPUs	MasterTool IEC XE	Firmware version
<b>NX3005</b>	2.07 to 2.09	1.6.0.0 to 1.7.17.0
<b>NX3005</b>	3.00 or above	1.8.11.0 or above

Table 11: Compatibility with other products

Additionally, along the development roadmap of MasterTool IEC XE some features may be included (like special Function Blocks, etc...), which can introduce a requirement of minimum firmware version. During the download of the application, MasterTool IEC XE checks the firmware version installed on the controller and, if it does not meet the minimum requirement, will show a message requesting to update. The latest firmware version can be downloaded from Altus website, and it is fully compatible with previous applications.

## Physical Dimensions

Dimensions in mm.

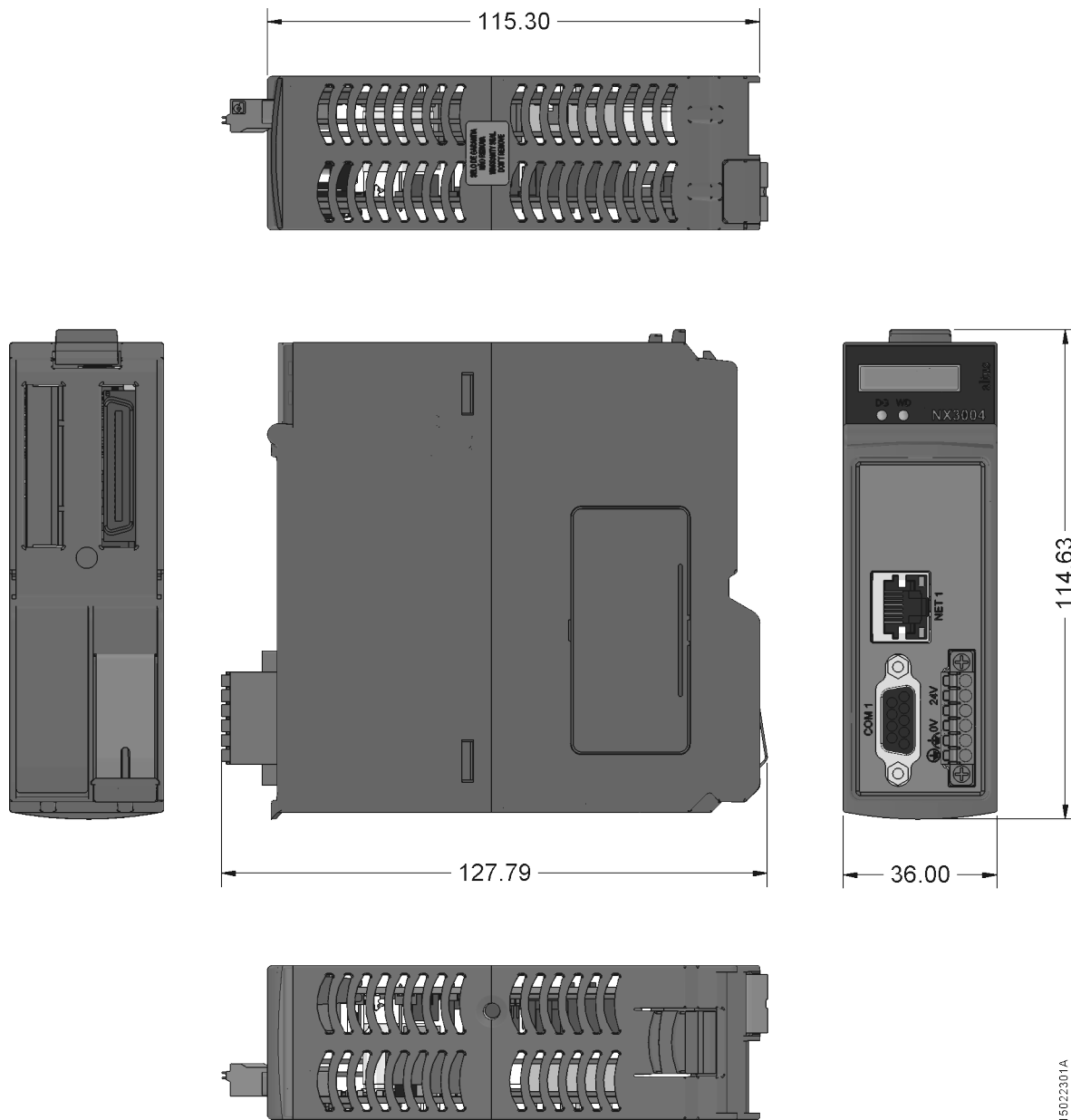


Figure 1: NX3004 and NX3005 CPU Physical Dimensions

## Manuals

For the correct application and use, the CPU Nexto NX3005 Series User Manual – MU214105 must be consulted.

For more technical details, configuration, installation and programming of Nexto Series, see the table below. This table is just a guide to some relevant documents that can be useful during the use, maintenance and programming of Nexto Series controllers. The complete and updated table containing all Nexto Series documents can be found at Nexto Series User Manual – MU214600.

Code	Description	Language
<b>CE114000</b>	Nexto Series – Technical Characteristics	English
<b>CT114000</b>	Série Nexto – Características Técnicas	Portuguese
<b>CS114000</b>	Serie Nexto – Características Técnicas	Spanish
<b>CE114104</b>	NX3005 Technical Characteristics	English
<b>CT114104</b>	Características Técnicas NX3005	Portuguese
<b>CS114104</b>	Especificaciones y Configuraciones NX3005	Spanish
<b>CE114700</b>	Nexto Series Backplane Racks Technical Characteristic	English
<b>CT114700</b>	Características Técnicas dos Bastidores da Série Nexto	Portuguese
<b>CS114700</b>	Características Técnicas de los Bastidores de la Serie Nexto	Spanish
<b>CE114810</b>	Nexto Series Accessories for Backplane Rack Technical Characteristics	English
<b>CT114810</b>	Características Técnicas Acessórios para Bastidor Série Nexto	Portuguese
<b>CS114810</b>	Características Técnicas del Cierres Laterales para el Bastidor	Spanish
<b>CE114902</b>	Nexto Series PROFIBUS-DP Master Technical Characteristics	English
<b>CT114902</b>	Características Técnicas do Mestre PROFIBUS-DP da Série Nexto	Portuguese
<b>CS114902</b>	Características Técnicas del Módulo Profibus-DP Maestro	Spanish
<b>CE114903</b>	Nexto Series Ethernet Module Technical Characteristics	English
<b>CT114903</b>	Características Técnicas Módulo Ethernet Série Nexto	Portuguese
<b>CS114903</b>	Características Técnicas del Modulo Ethernet Série Nexto	Spanish
<b>CE114908</b>	NX5110 and NX5210 PROFIBUS-DP Heads Technical Characteristics	English
<b>CT114908</b>	Características Técnicas Interfaces Cabeça PROFIBUSDP NX5110 e NX5210	Portuguese
<b>CS114908</b>	Especificaciones y Configuraciones PROFIBUS-DP Interfaz Cabezas NX5110 y NX5210	Spanish
<b>MU214600</b>	Nexto Series User Manual	English
<b>MU214000</b>	Manual de Utilização Série Nexto	Portuguese
<b>MU214617</b>	NX3005 CPU User Manual	English
<b>MU214105</b>	Manual de Utilização UCP NX3005	Portuguese
<b>MU299609</b>	MasterTool IEC XE User Manual	English
<b>MU299048</b>	Manual de Utilização MasterTool IEC XE	Portuguese
<b>MP399609</b>	MasterTool IEC XE Programming Manual	English
<b>MP399048</b>	Manual de Programação MasterTool IEC XE	Portuguese
<b>MU214601</b>	NX5001 PROFIBUS DP Master User Manual	English
<b>MU214001</b>	Manual de Utilização Mestre PROFIBUS-DP NX5001	Portuguese
<b>MU214608</b>	Nexto PROFIBUS-DP Head Utilization Manual	English
<b>MU214108</b>	Manual de Utilização da Cabeça PROFIBUS-DP Nexto	Portuguese
<b>MU214603</b>	Nexto Series HART Manual	English
<b>MU214610</b>	Advanced Control Functions User Manual	English
<b>NAP151</b>	Utilização do Tunneller OPC	Portuguese
<b>NAP152</b>	Extensão da potência de saída para até 20 W	Portuguese

<b>Code</b>	<b>Description</b>	<b>Language</b>
<b>NAP165</b>	Comunicação OPC UA com Controladores ALTUS	Portuguese
<b>NAP165_ing</b>	OPC UA Communication with ALTUS Controllers	English

Table 12: Related documents