# Pageant CODESYS Quick Start Guide





This manual describes how to setup the CODESYS v3 environment to work with the BEKA Pageant Operator Panel and start developing PLC applications.

This manual is not intended as a CODESYS V3 programming manual, for detailed documentation regarding CODESYS V3 Development System please refer to the CODESYS web site <u>https://www.codesys.com</u> and to and to its on-line help.

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## **1** Software Requirements

The following software packages are required throughout this document and can be accessed via the following links:

• CODESYS Runtime: this is the PLC Runtime installed on the Pageant CPU Module supplied by BEKA. Note that the runtime is already licensed so no activation is required.

The Runtime version installed can be accessed via the configuration menu. Refer to the Pageant Operator Panel System Instructions for details of the menu structure to access this information. <u>Make note of the runtime version supplied as the version of the CODESYS V3 Development System and the CODESYS Package below need to match.</u>

The Runtime includes the TargetVisu component to design custom screens and the Modbus RTU Fieldbus stack. Note that the BA3202 CPU Module needs to be purchased to implement Modbus RTU communication.

- The relevant version of the CODESYS Control for Pageant package can be downloaded from <u>https://www.beka.co.uk/pageant\_codesys\_files.html</u>
- The relevant version of the CODESYS V3 Development System can be downloaded from the Codesys website at (<u>https://store.codesys.com/en/codesys.html</u>)

#### 2 CODESYS V3 Development System Installation

CODESYS V3 Development System software must be used to develop applications on the BEKA Pageant Operator Panel. Once the software is downloaded, follow the on screen instructions to complete the installation.

#### 3 BEKA CODESYS Package Installation

A dedicated CODESYS Package is required to configure the Development System to work with the BEKA Pageant Operator Panel. Once you have downloaded the latest package from the BEKA website, double click on the .package file and the installation procedure will start automatically. The system will ask whether to perform a Complete or Typical setup, any of these will install all the required files. The package contains:

- A BEKAStyle Visualization Style: this restricts the colours available in the Visualization elements to the 4 levels of gray supported by the Operator Panel
- The CPU Module and Pageant Operator Panel Device Descriptions
- A BEKA project template to get up and running with the Visualization preconfigured and the Devices inserted in the project Device Tree

Once installed you can start the CODESYS Development System select Tools > Package Manager to check that the Package has been installed. The package should appear in the list of installed packages:

🗊 Package	Manager						×
Currently i Refresl	nstalled packages			Sort by Name	~	Install	
Name		Version	Installation date	Update info	License	Uninstall	
CODE CODE CODE CODE CODE CODE CODE CODE	SYS Control for Pageant SYS Package Designer SYS SoftMotion IT BASIC Manager Example Demo Mobile	3.5.15.30 3.5.15.0 4.6.0.0 3.3.4.0 1.0.0.2 1.0.0.4	05/08/2022 24/05/2022 11/03/2020 12/07/2021 09/08/2021 09/08/2021	Version 3.5.16.0 available! Free version 4.10.0.0 available! Free version 1.0.0.3 available!	License ir No licens No licens No licens No licens No licens	Details Updates Search Updates Download	
<	versions 🔽 Search upda	ates in backgro	bund		>	CODESYS Store Rating, CODESYS Store Close	

You can use the Package Manager to Uninstall or Install the Package when a new version becomes available.

#### 4 Creation of a new PLC Project

To create a new CODESYS project select File > New Project

Select the "Standard BEKA project", enter the project name and location then press OK.

管 New Project		$\times$
<u>C</u> ategories	Templates	
Libraries	Image:	
	Empty project HMI project Standard BEKA project Standard project	
	standard project w	
A project containing one device, one ap	plication, and an empty implementation for PLC_PRG	
Name Untitled 1		
Location C:\	~ <mark></mark>	ī
	OK Cancel	

Note that the project will open with 2 default task, a cyclic MainTask calling the POU PLC\_PRG every 100ms and the a VISU\_TASK handling all visualization updates every 100ms.

The PLC\_PRG POU is created by default using the Structured Text IEC language, to change this simply delete the PLC\_PRG POU in the Device Tree and insert a new POU under the application.

Devices	<b>→</b> ₽ X	<u> </u>	Alarm Configuration
Untitled 1	•	0	Application
🖹 🕤 Device (BA320	X Pageant CPU Module)		Data Sources Manager
PLC Logic		<b>*</b>	DUT
	Cut	- 📩	External File
	Cut		
	Сору		Global Variable List
E	Paste		Image Pool
×	Delete	⊶	Interface
	Refactoring •	2	Network Variable List (Receiver)
	, inclusion ing	- 🏈	Network Variable List (Sender)
	Properties	T	Persistent Variables
🖿 👔 ваз 🛅	Add Object 🔸	Ð	POU
( <b>`</b>	Add Folder	Ð	POU for implicit checks
Dĩ	Edit Object	<b>A</b>	Recipe Manager
	Edit Object with	ø	Redundancy Configuration
OS.	Login	••••	Symbol Configuration
		- 🖻	Text List
	Delete application from device	_ <b>@</b> <sup>ĝ</sup>	Trace
		2	Trend Recording Manager
		0	Unit Conversion
		<b>B</b>	Visualization

A new PLC\_PRG POU can then be created and the implementation IEC language of choice can be selected at the bottom.

Add POU ×					
Create a new POU (Program Organization Unit)					
Name					
PLC_PRG					
<u>I</u> ype					
• <u>P</u> rogram					
○ Function <u>b</u> lock					
Extends					
Implements					
Final Ab <u>s</u> tract					
Accessspecifier					
$\sim$					
Method implementation language					
Structured Text (ST)					
○ <u>F</u> unction					
Return type					
Implementation language					
Structured Text (ST) $\checkmark$					
Continuous Function Chart (CFC) Continuous Function Chart (CFC) - page-oriented					
Function Block Diagram (FBD)					
Sequential Function Chart (SFC)					

#### 5 Adding I/O Modules to the project

Expand the BA3101\_Pageant\_Operator\_Panel in the Device Tree to show the I/O Modules slots.



I/O Modules can be added under the BA3101 Pageant Operator Panel device, right click on any of the 7 slots corresponding to the slots on the rear panel of the BA3101 Display and select Plug Device. A list of all the I/O modules available will appear, select the Module required for the application and click on Plug Device.

Name Slot_1_1				
○ Append device ○ Insert device ● Pl	ug device 🔵 U	Ipdate devic	2	
String for a fulltext search	Vendor	<all th="" vendor<=""><th>s&gt;</th><th>~</th></all>	s>	~
Name			Vendor	Version
BA3301 Pageant Analogue Input	Module 4 x 4/20m	ηA	BEKA associates Ltd	3.5.15.31
🖬 BA3401 Pageant Digital Input Mod	dule 8 x Contact		BEKA associates Ltd	3.5.15.31
🖷 🚹 BA3402 Pageant Digital Input Mod	dule 8 x Proximity	Detector	BEKA associates Ltd	3.5.15.31
🐨 🔟 BA3501 Pageant Analogue Outpu	t Module 4 x 4/20	)mA	BEKA associates Ltd	3.5.15.31
🖷 🔟 BA3601 Pageant Digital Output M	BA3601 Pageant Digital Output Module 4 x Contact BEKA associates Ltd 3.5.15.			
	<b>T</b> 1 1			
BA3701 Pageant Input Module 2	x Totaliser or Cou	nter	BEKA associates Ltd	3.5.15.31
BA3701 Pageant Input Module 2  Group by category Display all version	x Totaliser or Cou	nter	BEKA associates Ltd	3.5.15.31
<ul> <li>BA3701 Pageant Input Module 2:</li> <li>Group by category Display all version</li> <li>Name: BA3301 Pageant Analogue Input Vendor: BEKA associates Ltd Categories: Version: 3.5.15.31 Order Number: BA3301 Description: 4 channel 4-20mA Input</li> </ul>	x Totaliser or Cou ons (for experts o out Module 4 x 4/	nter nly) 🗌 Dis 20mA	BEKA associates Ltd	3.5.15.31
<ul> <li>BA3701 Pageant Input Module 2:</li> <li>Group by category Display all version</li> <li>Name: BA3301 Pageant Analogue Input Vendor: BEKA associates Ltd Categories: Version: 3.5.15.31 Order Number: BA3301 Description: 4 channel 4-20mA Input</li> <li>Plug selected device into the slot Slot_1</li> <li>(You can select another target node in</li> </ul>	x Totaliser or Cou ons (for experts o out Module 4 x 4/ t Module	nter nly) Dis 20mA	BEKA associates Ltd	3.5.15.31

The device will now appear in the corresponding slot of the Device Tree. If you double click on the module, you will have access to the Module parameters (Serial Number, Module Number,...), the I/O map where the inputs and outputs for the module can be mapped to program variables.

🔣 Package Designer 🛛 🕸 N	1ainTask 🛛 🔮	👔 VISU_TASK 🛛 👔 [	Device	Front_Panel_Keys	🚹 BA	3101_Pag
BEKA:Operator_Display_Modules Parameters	Find		Filter S	how all		•
BEKA:Operator_Display_Modules I/O Mapping	Variable		Mapping	Channel Read Analogue Input Values	Address %OW9	Туре
BEKA:Operator_Display_Modules IEC Objects	  *•			Event Input Values	%QB18	BYTE
Status		Application.PLC_PRG.AI1	~⊘	Channel 1 Value	%QW10 %QW10	WORD
Information	- <b>*</b>			Channel 2 Value Channel 3 Value	%QW11 %QW12	WORD
				Channel 4 Value Loop Status	%QW13 %QB28	WORD BYTE

# 6 Display Keys and LEDs

The Front\_Panel\_LEDs and Front\_Panel\_Keys devices also appear under the BA3101\_Pageant\_ Operator\_Panel, these will give control of the touch buttons and front LEDs of the Pageant Display in a similar manner to the I/O modules.

## 7 Downloading PLC applications

To download PLC applications to the Pageant Operator Panel, you will need the BA3902 Pageant USB Programming Cable

Connect it to your PC 's USB port, the driver should be installed automatically. This cable emulates a serial port, the first thing to do is to find out the COM port number allocated to this cable. Press the Windows Logo Key and type Device Manager.

The USB Serial Port should be present under Ports (COM & LPT), make note of the COM port number (COM4 in this example):

📇 Device Manager	_	$\times$
<u>File Action View H</u> elp		
🗢 🔿   📰   😰 🖬   晃		
✓		^
> 4 Audio inputs and outputs		
> 💻 Computer		
> 👝 Disk drives		
> 🏣 Display adapters		
> 🔐 DVD/CD-ROM drives		
> 🎽 Firmware		
> 🛺 Human Interface Devices		
> 🔤 Keyboards		
> II Mice and other pointing devices		
> 🛄 Monitors		
> 🖵 Network adapters		
> Portable Devices		
🗸 🛱 Ports (COM & LPT)		
USB Serial Port (COM4)		
> I Print queues		
> 📇 Printers		
> Processors		~

In the CODESYS Development Environment, double click on the Device (BA3201 Pageant CPU Module) in the Device Tree on the left hand side, the Communication Settings window will appear:

Untitled1.project* - CODESYS				_	٥	×
<u>File E</u> dit <u>V</u> iew <u>P</u> roject <u>B</u> uild <u>O</u> nline	<u>D</u> ebug <u>T</u> ools <u>W</u> indow	<u>H</u> elp				₹
🎦 🚅 🔚 🕼 🗠 🗠 🖁 🛍 🗙 🖊 😘	🐴 🌿   📕 🗐 🦄	🛱   🛅 🕇 📑   🛗   Application [Device: PLC Logic]	- 05 08	9≣ 4≣ 4≣ \$   ¢	🛒   🚍	r
•						
Devices – 🕂 🗙	Reckage Designer	😸 MainTask 🛛 🍪 VISU_TASK 🛛 🔟 Devi	ice 🗙 👻	Visualization ToolBox	•	ą 🗙
Untitled 1		Scan Network Gateway - Device -		🗎   🗎   🔊		
Device (BA3201 Pageant CPU Module)	Communication Settings	Scarrice working obleway - Device -				
	Applications					
Library Manager	Backup and Restore					
MainTask	Files	Gateway	•			
VISU_TASK	Log	Gateway-1 V	[0002] (active) 🗸 🗸			
<ul> <li>Visualization Manager</li> <li>Visualization</li> </ul>	PLC Settings	IP-Address: localhost	Device Name: BA3201_CPU_Module			
BA3101_Pageant_Operator_Panel (BA3101	PLC Shell	Port:	Device Address:			
Front_Panel_LEDS (Front Panel LEDS)	Users and Groups	1217	0002			
/ , , , , , , , , , , , , , , , , ,	Access Rights		1711 0001			
- <b>K</b> Slot_3 - <b>K</b> Slot 4	Symbol Rights		4096			
L Slot_5 L Slot_6	IEC Objects		Target Vendor: BEKA associates Ltd			
Slot_7	Task Deployment		Target Version: 3.5.15.30		~ ~	
	Status					
	Information					
					Q.	
Devices Modules POUs		Your device can be secured. Learn more		Properties 🖷 Visu	ualization T	ToolBox

Select Gateway > Configure Local Gateway, add a New Top Level Interface as a COM port. Ensure the settings are set as below, amending the Name, Port and Local Address to match with your COM port number:

Gateway Configuration X							
Interface	Setting						
Name Baudrate Port	Com<4> 115200 4						
To display additional information about any ite keys.	em listed above, select it with your mouse or up and down						
Add Delete Up	<u>D</u> own <u>OK</u> ancel						

Confirm by clicking OK.

Connect the other end of the BA3902 to the programming port SK3 on the Pageant CPU Module.

Power up the Pageant Operator Panel and ensure the system has reached the point where the Codesys Runtime has started which is indicated by an Amber or Green Status LED on the Display.



Once the Gateway configuration has been changed, the Codesys Gateway needs to be restarted for the change to take effect. Find the Codesys Gateway in the Windows System Tray, right click and select "Stop PLC". Then Right Click again and select "Start PLC".



On the CODESYS Communication Settings window, select Scan Network, the BA3201 CPU Module should appear under the Gateway:

Select Device			×
Select the network path to the controller:			
Gateway-1	Device Name: BA3201 _CPU_Module	<ul> <li>Scan Netv</li> <li>Wink</li> </ul>	vork
	Device Address: 0002		
	Block driver: COM		
	Encrypted Communication: TLS supported		
	Number of channels: 4		
	Serial number: 000CC601CA06		
	Target ID: 1711 0001	~	
		<u>O</u> K <u>C</u> a	ncel

Select the CPU Module and validate with OK, you will now have a green LED on the device confirming you are connected to the Pageant CPU.

Communication Settings	Scan Network Gateway 👻	Device 🝷	
Applications			
Backup and Restore			
Files			····
Log		Gateway	
DLC Sattings		Gateway-1	[0002] (active)
PEC Settings		IP-Address: localhost	Device Name: BA3201_CPU_Module
PLC Shell		Port: 1217	Device Address: 0002
Users and Groups			Target ID:
Access Rights			1711 0001
Symbol Rights			Target Type: 4096
IEC Objects			Target Vendor: BEKA associates Ltd
Task Deployment			Target Version: 3.5.15.30
Status			
Information			

You can now Download and Debug IEC applications to the Pageant Operator Panel.

## 8 Adding Modbus RTU Connectivity

To add Modbus RTU Connectivity to the IEC application, right click on the Pageant CPU Module at the top of the device tree and select Add Device...

An "Add Device" window will appear, select Fieldbuses > Modbus > Modbus Serial Port > Modbus COM



Confirm by Clicking on Add Device. A Modbus\_COM device now appear in the Device tree on the left hand side. Double Click on this new Device and select the General tab which will display the Serial Port Configuration. The COM port always needs to be selected as 1, this is the port allocated inside the CPU module to Fieldbus communications. The other settings (Baud Rate, Parity, Data Bits and Stop Bits) need to match the settings of the other devices on the bus.

Right Click on Modbus\_COM in the Device Tree, you can then add either a Modbus Serial Device if the Pageant Operator Panel is a Modbus Slave or Modbus Serial Master if the Pageant Operator Panel is a Modbus Master.

For further details on how to configure the Modbus communications with other devices, please refer to the CODESYS Development System documentation under Fieldbus Support.



## 9 CODESYS Vizualisation

The CODESYS runtime on Pageant includes the TargetVisu component which gives the ability to design graphical user interfaces.

In the device tree a Visualization screen is already inserted in the project by default. By double clicking on it you will see a blank screen.



The screen sizes is already set up to 320 X 240 pixels to match with the LCD size of the Display and the fonts are restricted to the list of fonts available in the BA3101 Display.

The Pageant CODESYS package includes a BekaStyle Visualization style which restricts the colours to the 4 greyscale available on the BA3101 Display.

Elements from the Vizualisation Toolbox can be dragged and dropped on the screen to build the User Interface, Please refer to the CODESYS Vizualisation Help content for more information.

