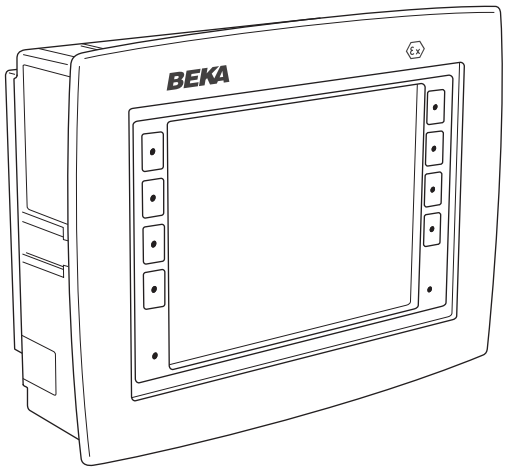
Instructions for BA3101 and BA3102 Pageant Operator Displays



Issue 6
20th October 2025

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1. INTRODUCTION

The BA3101 and BA3102 are IECEx, ATEX and UKEX certified intrinsically safe Operator Displays. They are the core of the Pageant Operator Display System comprising a 7 inch backlit display with 8 touch buttons, plus 8 sockets which can accommodate a single CPU module and up to 7 input and output modules.

BA3101 and BA3102 Operator Displays are mechanically and electrically identical, except for their display windows and certification. The BA3101 has a stainless steel front panel surrounding a toughened glass display window.

The BA3102 has a stainless steel front panel surrounding an impact resistant polycarbonate window with a scratch resistant exterior hard coating. The BA3102 certification allows the Operator Display to be installed in an Ex e or Ex t enclosure without invalidating the enclosure's certification.

Both models have third party certified !P66 front panel ingress protection.

Operator Displays and all of the plug-in modules have individual intrinsic safety apparatus certificates. Compatible input and output safety parameters allow any certified BEKA plug-in Pageant CPU module to be fitted in display socket 'C'. Similarly, any certified BEKA plug-in Pageant input or output module may be fitted into sockets 1 to 7, providing the sum of the percentage power consumption of all the modules fitted does not exceed 100%. See Pageant System Operator Panel instructions for further details.

Apart from an earth stud, all field connections to the Pageant Operator Displays are made via removable terminals on the plug-in modules.

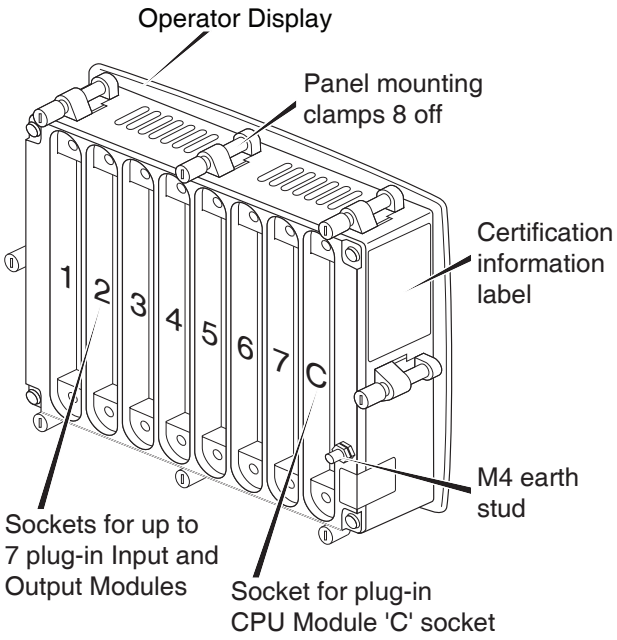

Fig 1 Rear view of BA3101 or BA3102 without plug-in modules

Pageant Operator Displays are CE marked to show compliance with the *European Explosive Atmospheres Directive 2014/34/EU* and the *European EMC Directive 2014/30/EU.*

Operator Displays are also UKCA marked to show compliance with UK statutory requirements *Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations UKSI 2016:1107 (as amended)* and with the *Electromagnetic Compatibility Regulations UKSI 2016:1091.*

2. INTRINSIC SAFETY CERTIFICATION

Notified Body CML B.V. and UK Approved Body Eurofins CML have issued the Pageant Operator Displays with the following apparatus certificates:

IECEx	IECEx CML 20.0150X
ATEX	CML 20ATEX2252X
UKEX	CML21UKEX2003

The ATEX certificate confirms compliance with harmonised European standards and this has been used to confirm compliance with the European ATEX Directive for Group II, Category 1G and 1D equipment. The Operator Displays carry both the CE and UKCA marks, subject to local codes of practice, they may be installed in any of the European Economic Area (EEA) member countries and in the UK. ATEX certificates are also acceptable for installations in some non EU countries.

These instructions describe IECEx, ATEX and UKEX installations which conform with IEC / EN 60079-14 *Electrical installations design, selection and erection*. When designing systems the local code of practice should be consulted.

2.1 Gas atmospheres - Zones, gas groups and T rating

All of the Operator Display certificates specify the same gas code:

Ex ia IIC T4 Ga -40°C ≤ Ta ≤ 65°C

The Operator Display has no external connections, the only input and output intrinsic safety parameters are for the plug-in modules. It is therefore only necessary for the specifier and installer to ensure that all the plug-in modules are manufactured by BEKA and are certified for use with a Pageant Operator Display.

When fitted with a certified BEKA plug-in CPU module and certified BEKA plug-in input and output modules, the Operator Display may be installed in:

Zone 0	explosive gas air mixture continuously present. (Unlikely requirement for a display)
Zone 1	explosive gas air mixture likely to occur in normal operation.
Zone 2	explosive gas air mixture not likely to occur, and if it does will only exist for a short time.

Be used with gases in groups:

Group	A	propane
Group	B	ethylene
Group	C	hydrogen

In gases that may be used with equipment having a temperature classification of:

T1	450°C
T2	300°C
T3	200°C
T4	135°C

At an ambient temperature Ta between -40°C and +65°C

2.2 Dust atmospheres - Zones

All of the Operator Display certificates specify the same dust code:

Ex ia IIIC T135°C Da -40°C ≤ Ta ≤ 65°C.

For applications in dust atmospheres, the certificates specify Special Conditions of Use (See section 2.3) which require the rear of the Operator Panel to have additional protection. This requirement can be satisfied by mounting the Operator Display in a component certified Ex t enclosure with cable glands providing a minimum IP5X sealing.

When fitted with a certified BEKA plug-in CPU module and certified BEKA plug-in input and output modules, the BA3101 may be installed in:

Zone 20	explosive atmosphere in the form of a cloud of combustible dust in air is continuously present, or for long periods or frequently.
Zone 21	explosive atmosphere in the form of a cloud of combustible dust in air is likely to occur occasionally in normal operation.
Zone 22	explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation, but if it does occur, will only persist for a short period.

Be used with dust in subdivisions:

IIIA	combustible flyings
IIIB	non-conductive dust
IIIC	conductive dust

2.3 Special conditions for safe use

All three certificate numbers have an 'X' suffix indicating that special conditions apply, please see certificates.

i. Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. In addition, the equipment shall only be cleaned with a damp cloth.

ii. The metal bezel of the equipment shall be connected to earth via the integral earth stud.

iii. In installations requiring EPLs Da, Db, or Dc, the surface temperature assigned to this equipment shall take precedence over the surface temperature assigned to any plug-in module which may be installed within its enclosure.

iv. In installations requiring EPL Da, Db, or Dc, the equipment shall be mounted to an enclosure which provides a minimum degree of protection of IP5X and which meets the requirements of EN60079-0 Clause 8.4 (material composition requirements for metallic enclosures for Group III) and/or EN60079-0 Clause 7.4.3 (Avoidance of a build up of electrostatic charge for Group III) as appropriate.

All cable entries into the equipment shall be made via cable glands which provided a minimum degree of protection of IP5X

2.4 Certification label information

The certification information label is fitted to the side of the Pageant Operator Display. It shows the model number, certification information and BEKA associates address and year of manufacture together with the serial number.

Certification Information Label

3. INSTALLATION

3.1 BA3101 location

The BA3101 Pageant Operator Display has a 316 stainless steel front panel surrounding the backlit display which is protected by a 4mm thick toughened glass window. The front of the Operator Display has IP66 protection and a silicone moulded gasket provides an IP66 seal to the instrument panel. The rear of the BA3101 Pageant Operator Display has IP20 protection.

The BA3101 may be installed in any panel providing the environmental and safety limits shown in the specification are not exceeded. Although the front of the Operator Display has IP66 protection, it should be shielded from continuous direct sunlight and severe weather conditions.

Fig 2 shows the overall dimensions of the BA3101 including the plug-in modules and the panel cut-out dimensions.

3.2 BA3102 location

The BA3102 Pageant Operator Display has a 316 stainless steel front panel surrounding the backlit display which is protected by a scratch resistant 4mm thick polycarbonate window. The front of the Operator Display has certified impact and IP66 ingress protection which allows the BA3102 to be installed in a certified Ex e or Ex t enclosure without invalidating the enclosure's component certification.

The rear of the BA3102 has IP20 protection.

Fig 2 shows the overall dimensions of the BA3102 including the plug-in modules and the panel cut-out dimensions.

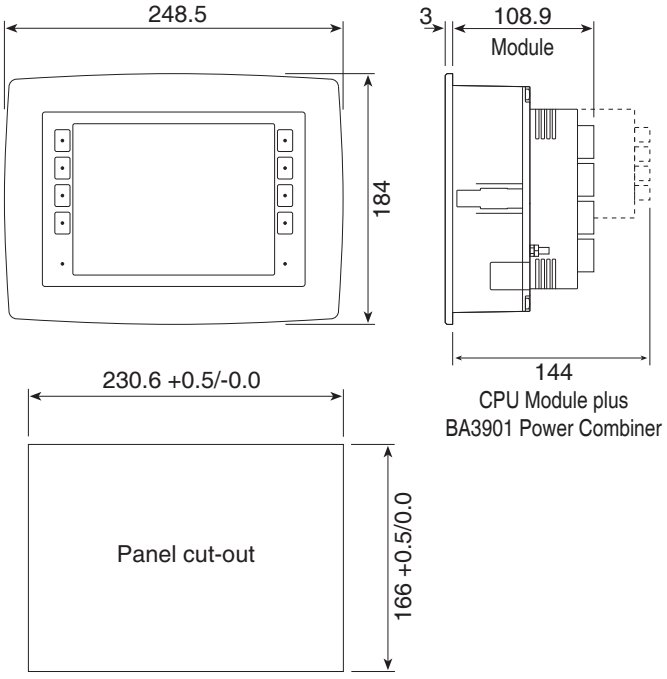

Fig 2 BA3101 and BA3102 dimensions including plug-in modules and panel cut-out

3.3 BA3101 Operator Display Installation Procedure

1. Cut the aperture specified in Fig 2 in the panel and ensure that all edges are de-burred.

2. First ensure that all eight panel mounting clamps are closed by turning the knurled screws fully anticlockwise until the two pips in the clamp foot align with holes in the clamp body as shown in Fig 3.

3. Ensure that the panel sealing gasket is correctly positioned before inserting the Operator Display into the panel aperture.

4. Place a clamp in the recess on each side of the Operator Display, pulling gently to slide it onto the dovetail as shown in Fig 3. Push the knurled screw slightly forward to engage the thread and tighten by turning clockwise until it is just finger tight. When both clamps are fitted ensure that the gasket behind the front panel bezel remains correctly positioned before fitting the remaining panel mounting clamps. Finally, fully tighten all the panel clamps to secure the instrument. The maximum recommended clamp tightening torque is 25cNm (2.2 lbf in) which is approximately equivalent to finger-tight plus one half turn. Do not over tighten.

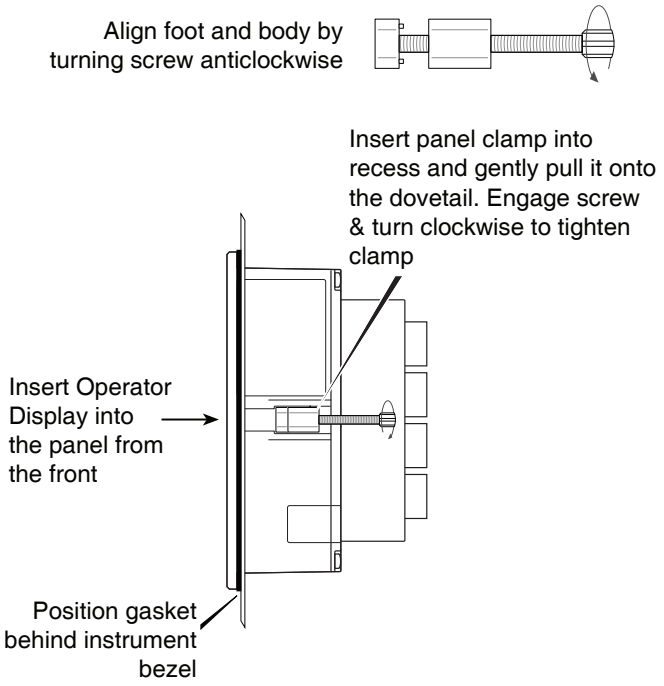

Fig 3 Installation of Operator Panel and mounting clamps

4. PLUG-IN MODULES

Pageant Operator Displays can accommodate one plug-in CPU module in the right hand socket, marked 'C' and up to seven plug-in input or output modules in the remaining sockets marked 1 to 7 as shown in Fig 1. Modules have keyed plugs and sockets which ensure that an input or output module can not be fitted in the 'C' socket and a CPU module can not be fitted in sockets marked 1 to 7.

All Operator Displays must be fitted with a plug-in CPU module which contains the central processing unit and memory. It also distributes power to the display and to all of the plug-in input and output modules from a BEKA Power Isolator located in the safe area or in Zone 2. Some CPU modules also include an external communication port.

Input and output modules may be fitted in any of the seven sockets most convenient for field wiring, they do not have to be installed in a specific position or order, but their position does have to be entered in the application software.

4.1 Installing a plug-in module

All Pageant plug-in modules are installed in the same way and may be fitted before or after the Operator Display is mounted in a panel or cubicle. The Operator Display should not be powered while a plug-in module is being inserted or removed.

For a hazardous area installation plug-in modules must be manufactured by BEKA and have certification that specifies that they shall be used as part of a BEKA Pageant system.

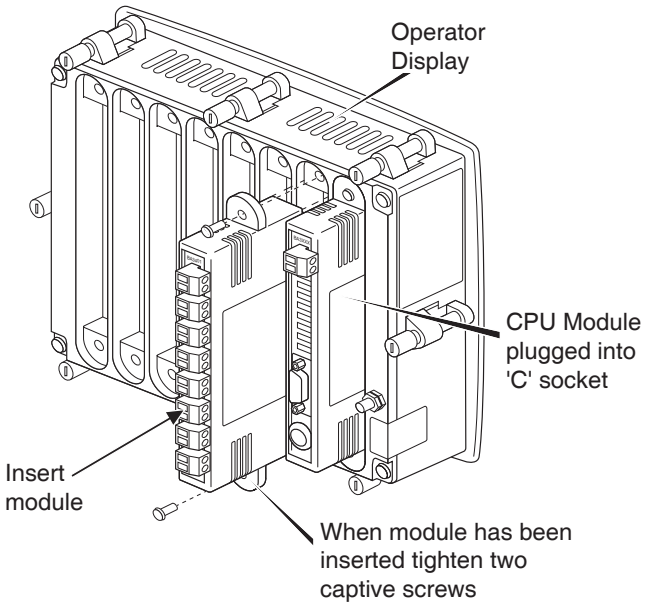

Fig 4 Installing plug-in modules

5. FIELD WIRING

All field connections to the Operator Displays are made via the removable terminals on the plug-in modules which are described in the instructions supplied with each module. Apart from the earth stud, there are no direct field connections to the Pageant Operator Display.

The M4 earth stud is located on the right hand side at the rear of the Operator Display as shown in Fig 1. It should be connected to earth and to the metallic structure of the enclosure in which the Pageant Operator Display is mounted.

To simplify installation, all module field wiring terminals are removable by gently pulling. Wiring should be supported to prevent damage to the connectors, particularly in installations subject to vibration.

6. ACCESSORIES

6.1 Tag number

The Pageant Operator Display can be identified by a tag number or application information thermally printed on a self-adhesive label fitted to the side of the instrument.

7. MAINTENANCE

Operator Displays should be regularly inspected to ensure that they have not been damaged. The frequency of inspections depends upon the environmental conditions.

No attempt should be made to repair a faulty Pageant Operator Display. Suspect Operator Displays should be returned to BEKA associates or your local BEKA agent.

8. GUARANTEE

Operator Displays which fail within the guarantee period should be returned to BEKA associates or your local BEKA agent. It is helpful if a brief description of the fault symptom(s) is provided.

9. CUSTOMER COMMENTS

BEKA associates are always pleased to receive comments from customers about our products and services. All communications are acknowledged and whenever possible, suggestions are implemented.

APPENDIX 1
Pageant Operator Display CODESYS Mapping and Parameters

The Pageant Codesys Quick Start Guide which can be downloaded from the BEKA website https://www.beka.co.uk/manuals/pageant_codesys_quick_start_guide.pdf explains how to setup the CODESYS v3 environment to work with a BEKA Pageant Operator Display and to start developing PLC applications.

The BEKA Quick Start Guide is not a programming manual. For detailed documentation about the CODESYS v3 development system please refer to https:/www.codesys.com and to the on-line help.

The following table lists the Pageant Operator Display CODESYS parameters that can be set and mapped during the initialisation of the PLC application which is described in the BEKA Quick Start Guide. If the values are not set in the Codesys project, the default values will be used.

Pageant Operator Display CODESYS Mapping and Parameters

Channel or Parameter Name		Type	Default	Variable Type	Range	Description
System Temperature		Input	N/A	REAL	32 bits Float	Display Temperature in degC
Backlight Control		Output	N/A	BOOL	0..1	0: Backlight OFF, 1: Backlight ON
Left Side LED1	LED Control	Output	N/A	BOOL	0..1	0: LED OFF, 1: LED ON
	LED Colour	Output	N/A	BYTE	1..3	1: Red, 2: Green, 3: Amber
Left Side LED2	LED Control	Output	N/A	BOOL	0..1	0: LED OFF, 1: LED ON
	LED Colour	Output	N/A	BYTE	1..3	1: Red, 2: Green, 3: Amber
Left Side LED3	LED Control	Output	N/A	BOOL	0..1	0: LED OFF, 1: LED ON
	LED Colour	Output	N/A	BYTE	1..3	1: Red, 2: Green, 3: Amber
Left Side LED4	LED Control	Output	N/A	BOOL	0..1	0: LED OFF, 1: LED ON
	LED Colour	Output	N/A	BYTE	1..3	1: Red, 2: Green, 3: Amber
Right Side LED1	LED Control	Output	N/A	BOOL	0..1	0: LED OFF, 1: LED ON
	LED Colour	Output	N/A	BYTE	1..3	1: Red, 2: Green, 3: Amber
Right Side LED2	LED Control	Output	N/A	BOOL	0..1	0: LED OFF, 1: LED ON
	LED Colour	Output	N/A	BYTE	1..3	1: Red, 2: Green, 3: Amber
Right Side LED3	LED Control	Output	N/A	BOOL	0..1	0: LED OFF, 1: LED ON
	LED Colour	Output	N/A	BYTE	1..3	1: Red, 2: Green, 3: Amber
Right Side LED4	LED Control	Output	N/A	BOOL	0..1	0: LED OFF, 1: LED ON
	LED Colour	Output	N/A	BYTE	1..3	1: Red, 2: Green, 3: Amber
Left Side KEY1		Input	N/A	BOOL	0..1	0: No Key Press, 1: Key Pressed
Left Side KEY2						
Left Side KEY3						
Left Side KEY4						
Right Side KEY1						
Right Side KEY2						
Right Side KEY3						
Right Side KEY4						

EU Declaration of Conformity

This declaration of conformity for electrical apparatus is issued under the sole responsibility of the manufacturer

Description
BA3101 is an intrinsically safe Pageant Operator Display.

Manufactured by
BEKA associates Ltd, Old Charlton Road, Hitchin, Herts. UK. SG5 2DA

Council Directives this equipment complies with:

2014/34/EU (ATEX Directive)

Relating to equipment and protective systems intended for use in potentially explosive atmospheres.

Provisions of the Directive fulfilled by the equipment:

Group II Category 1G Ex ia IIC T4 Ga -40°C ≤ Ta ≤ +65°C
Group II Category 1D Ex ia IIIC T135ºC Da -40°C ≤ Ta ≤ +65°C

Notified Body for EU-Type Examination
CML B.V., Chamber of Commerce No 6738671, Koopvaardijweg 32, 4906CV Oosterhout, The Netherlands, Notified Body Number 2776

Notified Body for production
INTERTEK ITALIA SPA 2575 Via Guido Miglioli, 2/A 20063 Cernusco sul Naviglio (MI) Italy.

EU-Type Examination Certificate
CML 20ATEX2252X Issue 2 14th May 2024

Standards used:
EN IEC 60079-0:2018 and EN 60079-11:2012

2014/30/EU (EMC Directive)

Standards used:
EN 61326-1:2013

2011/65/EU (RoHS Directive) relating to hazardous substances in electronic and electrical equipment.

2015/863/EU additional substances added by amending Annex II to Directive 2011/65/EU as regards the list of restricted substances.

CE **mark first affixed in 2021**

Authorised Signatory:

Olivier Lebreton CEng MIET
Managing Director

Issue 1	1st November 2021
Issue 2	15th May 2024

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EU Declaration of Conformity

This declaration of conformity for electrical apparatus is issued under the sole responsibility of the manufacturer

Description
BA3102 is an intrinsically safe Pageant Operator Display.

Manufactured by
BEKA associates Ltd, Old Charlton Road, Hitchin, Herts. UK. SG5 2DA

Council Directives this equipment complies with:

2014/34/EU (ATEX Directive)

Relating to equipment and protective systems intended for use in potentially explosive atmospheres.

Provisions of the Directive fulfilled by the equipment:

Group II Category 1G Ex ia IIC T4 Ga -40°C ≤ Ta ≤ +65°C
Group II Category 1D Ex ia IIIC T135ºC Da -40°C ≤ Ta ≤ +65°C
CML 20ATEX2252X Issue 2 14th May 2024
The front of the BA3102 complies with the requirements of EN/IEC 60079-0 for Metallic and non- Metallic parts (Group II or Group III) equipment. When a BA3102 is correctly installed in an Ex e or Ex t certified enclosure, the BA3102 will not invalidate the certification of the enclosure and maintain the IP rating of the enclosure to a degree of IP66 protection.

Notified Body for EU-Type Examination
CML B.V., Chamber of Commerce No 6738671, Koopvaardijweg 32, 4906CV Oosterhout, The Netherlands, Notified Body Number 2776

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EU-Type Examination Certificate
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Standards used:
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2014/30/EU (EMC Directive)

Standards used:
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2011/65/EU (RoHS Directive) relating to hazardous substances in electronic and electrical equipment.

2015/863/EU additional substances added by amending Annex II to Directive 2011/65/EU as regards the list of restricted substances.

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Issue 1 15th May 2024

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All associated manuals, certificates, and datasheets can be downloaded from
https://www.beka.co.uk/qr-ba3101_1

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