

Instructions for BA3501 Pageant Analogue Output Module 4 x 4/20mA

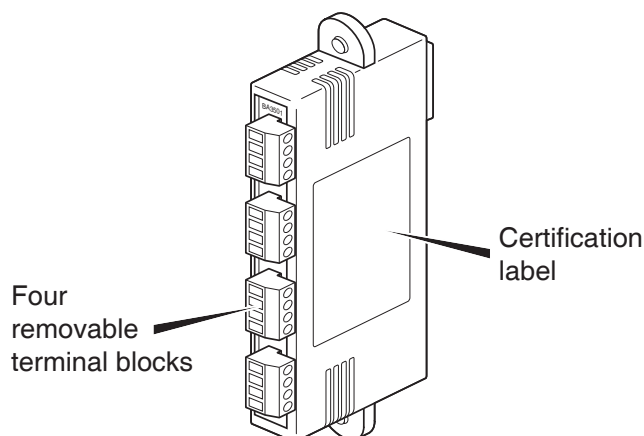
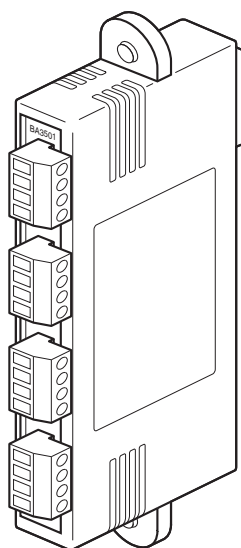


Fig 1 BA3501 Pageant Analogue Output module 4 x 4/20mA

Issue 3
23rd March 2023

BEKA associates Ltd. Old Charlton Rd, Hitchin, Hertfordshire, SG5 2DA, UK Tel: +44(0)1462 438301 e-mail: sales@beka.co.uk
web: www.beka.co.uk

1. INTRODUCTION

The BA3501 plug-in analogue output module has four galvanically isolated unpowered 4/20mA passive outputs which function as loop powered instruments. Separate IECEx, ATEX and UKEX intrinsic safety apparatus certification allows the module to be safely plugged into any one of the seven slots on a Pageant BA3101 operator panel.

The output safety parameters of each channel are zero which simplifies connection in series with a wide range of intrinsically safe voltage sources to produce a 4/20mA control signal in any gas or dust atmosphere.

2. INTRINSIC SAFETY CERTIFICATION

Notified Body CML B.V. and UK Approved Body Eurofins CML have issued plug-in BA3501 Pageant Analogue Output modules with the following apparatus certificates:

IECEX	IECEX CML 21.0131X
ATEX	CML 21ATEX21163X
UKEX	CML 21UKEX21164X

The ATEX certificate has been used to confirm compliance with the European ATEX Directive for Group II, Category 1GD equipment, similarly the UKEX certificate has been used to confirm compliance with UK statutory requirements. All BA3501 modules carry both the CE and UKCA marks therefore, 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 Zones, gas groups and T rating

All of the BA3501 certificates specify the same certification codes:

Ex ia IIC T4 Ga
Ex ia IIIC T135°C Da*
-40°C ≤ Ta ≤ 65°C

* Dust certification requires the Pageant Operator Panel and the BA3501 module to have a minimum additional IP54 rear protection - see 2.2 ii.

Plug-in BA3501 Pageant AO Modules are CE marked to show compliance with the European Explosive Atmospheres Directive 2014/34/EU and the European EMC Directive 2014/30/EU.

The modules 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.

2.2 Special conditions for safe use

- 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. 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 provide a minimum degree of protection of IP5X.
- iii. The BA3501 plug-in module shall only be used as part of a BEKA Pageant system.

2.3 Certification label information

The certification information label is fitted to the side of the plug-in BA3501 module. It shows the model number, certification information, BEKA associates address and year of manufacture together with the serial number.



Certification Information Label

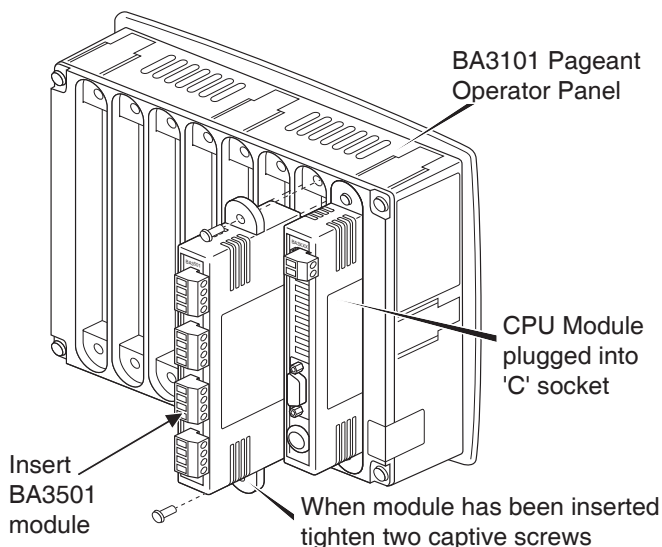


Fig 2 Inserting BA3501 module into one of seven sockets

3. INSTALLATION

The BA3501 plug-in module should be fitted into one of the seven sockets at the rear of a BA3101 Pageant Operator Panel as shown in Fig 2.

For a hazardous area installation the plug-in AO module should be manufactured by BEKA and have certification that specifies that it shall be used as part of a BEKA Pageant system.

3.1 Power consumption

The intrinsic safety certification of the BA3501 plug-in module permits any combination to be installed in a Pageant BA3101 display, but there are power limitations.

The percentage of the total available power that the BA3501 consumes is:

BA3501	4 x 4/2mA outputs	4%
--------	-------------------	----

The sum of the percentage power consumption's of all the plug-in modules installed in a BA3101 display must not exceed 100%.

3.1 Plug-in BA3501 module Installation

1. The module may be fitted before or after the Operator Panel is installed. The Operator Panel should not be powered while the module is being fitted.
2. Carefully insert the module into the selected slot at the rear of the BA3101 Pageant Operator Panel. When correctly positioned secure the module by tightening the two captive module fixing screws.
3. Connect field wiring to each of the four removable output terminal blocks. All the outputs are identical as shown in Fig 3. Each of the four outputs is a galvanically isolated intrinsically safe circuit and field wiring should comply with segregation requirements specified in IEC/EN 60079-14. If a multicore cable is used for the outputs, it should have Type A or B construction as specified in Clause 16.2.2.7 of IEC/EN 60079-14. Wiring should be supported to avoid damaging the module's terminals.

4. OUTPUTS

The Pageant BA3501 module has four galvanically isolated loop powered 4/20mA outputs. Each is certified as a separate intrinsically safe circuit with the following safety parameters:

U_i	=	30V
I_i	=	200mA
P_i	=	0.66W
U_o	=	0
I_o	=	0
P_o	=	0
C_i	=	0
L_i	=	4 μ H

The output safety parameter of each channel are zero which allows connection in series with almost any intrinsically safe voltage source with output parameters equal to, or less than, the BA3501 input parameters.

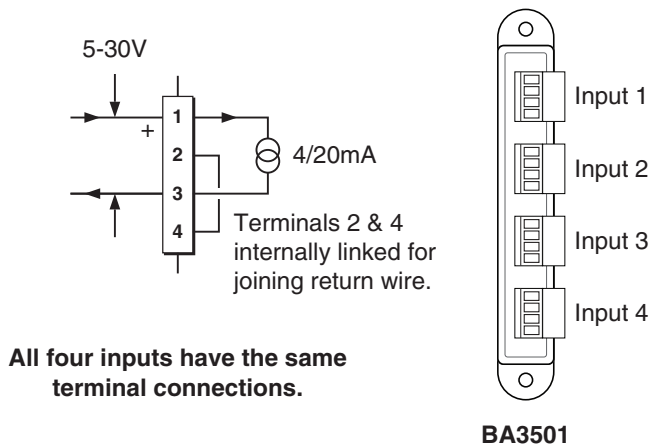


Fig 3 4/20mA output terminals

4.1 Generating a 4/20mA output signal

To generate a 4/20mA output current an intrinsically safe voltage source, usually from a galvanic isolator or a Zener barrier, should be connected in series with each of the modules outputs as shown in Fig 4. The output safety parameters of the intrinsically safe voltage source should be equal to, or less than, the input parameters of a single channel of the BA3501 module. For some hazardous area loads which have a low voltage drop, such as a loop powered indicator, a single Zener barrier or galvanic isolator can power two 4/20mA loops.

The output safety parameters of each BA3501 channel are zero and the internal inductance is very small and can usually be ignored.

Terminals 2 and 4 of each BA3501 input are internally linked for joining the return 4/20mA wire as shown in Fig 4.

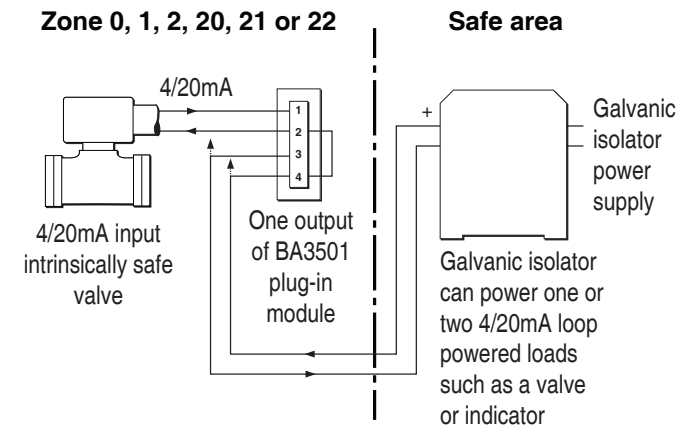


Fig 4 Connection for controlling position of a 4/20mA valve

5. MAINTENANCE

A BA3501 4/20mA output module should be regularly inspected to ensure that it has not been damaged. The frequency of inspection depends upon environmental conditions.

No attempt should be made to repair a faulty plug-in module. Suspect modules should be returned to BEKA associates or your local BEKA agent.

6. GUARANTEE

Modules 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 symptoms is provided.

7. 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

BA3501 Pageant Analogue Output Module 4 x 4/20mA 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 Panel 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 BA3501 Pageant Analogue Output Module 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.

BA3501 Analogue Output Module Codesys Mapping and Parameters

Channel or Parameter Name	Type	Default	Variable Type	Range	Description
Channel 1 Output Value	Output	N/A	WORD	3000...22000	Channel current value in μ A
Channel 2 Output Value					
Channel 3 Output Value					
Channel 4 Output Value					
Loop Status	Input	N/A	BYTE	0...15	Bit Field: Bit7...Bit4 represent the loop value range for Channel 4 to 1 0: No Fault 1: Output out of range Bit3...Bit0 represent the status for Channel 4 to 1 0: No Fault 1: Loop Disconnected



All associated manuals, certificates, and datasheets can be downloaded from https://www.beka.co.uk/qr-ba3501_1

BEKA associates

Old Charlton Rd, Hitchin, Hertfordshire, SG5 2DA, UK
Tel: +44(0)1462 438301 e-mail: sales@beka.co.uk
web: www.beka.co.uk