



Member of the FM Global Group

FM Approvals
1151 Boston Providence Turnpike
P.O. Box 9102 Norwood, MA 02062 USA
T: 781 762 4300 F: 781-762-9375 www.fmapprovals.com

CERTIFICATE OF COMPLIANCE

HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment:

BA304Cabc - 4/20 mA Loop Powered 3 1/2 Digit Indicator

IS / I, II, III / 1 / ABCDEFG / T4 Ta = 60°C — CI300-22; Entity; Type 4

NI / 1 / 2 / ABCD / T4 Ta = 60°C; Type 4

S / II, III / 2 / FG / T4 Ta = 60°C; Type 4

Entity parameters

Terminals	Vmax (V)	I _{max} (mA)	P _{max} (W)	CI (μF)	LI (mH)
1, 2, 3 and 4	32	200	1.2	0.02	0.01
12 and 13	32	159	1.2	0.03	0.01

a = Display at 0 mA: XXXX.

b = Display at 20 mA: XXXX (with decimal point position and polarity).

c = Accessories: root extractor or calibrator, scale plate, tag plate, pipe mounting kit, panel mounting kit.

Special conditions of use

1. The BA304C shall be protected from direct exposure to sunlight.

BA307Cabc - 4/20 mA Loop Powered 3 1/2 Digit Indicator

IS / I / 1 / ABCDEFG / T4 Ta = 60°C — CI300-22; Entity; Type 4*

NI / 1 / 2 / ABCD / T4 Ta = 60°C; Type 4*;

*front panel only

Entity parameters

Terminals	Vmax (V)	I _{max} (mA)	P _{max} (W)	CI (μF)	LI (mH)
1, 2, 3 and 4	32	200	1.2	0.02	0.01
12 and 13	32	159	1.2	0.03	0.01

a = Display at 0 mA: XXXX.

b = Display at 20 mA: XXXX (with decimal point position and polarity).

c = Accessories: backlight, root extractor or calibrator, scale card, tag strip.

Special conditions of use

1. To maintain the Type 4 enclosure rating the BA307C shall be installed in accordance with the mounting conditions provided on drawing numbers CI300-32.
2. The BA307C shall be installed in compliance with the enclosure, mounting, spacing and segregation

requirements of the ultimate application.

3. The BA307C shall be protected from direct exposure to sunlight.

BA308Cabc - 4/20 mA Loop Powered 3 ½ Digit Indicator

IS / I / 1 / ABCDEFG / T4 Ta = 60°C; — CI300-22; Entity; Type 4*

NI / I / 2 / ABCD / T4 Ta = 60°C; Type 4*;

*front panel only

Entity parameters

Terminals	Vmax (V)	I _{max} (mA)	P _{max} (W)	C _i (μF)	L _i (mH)
1, 2, 3 and 4	32	200	1.2	0.02	0.01
12 and 13	32	159	1.2	0.03	0.01

a = Display at 0 mA: XXXX.

b = Display at 20 mA: XXXX (with decimal point position and polarity).

c = Accessories: root extractor or calibrator, scale card, tag strip.

Special conditions of use

1. To maintain the Type 4 enclosure rating the BA308C shall be installed in accordance with the mounting conditions provided on drawing numbers CI300-32.

2. The BA308C shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.

3. The BA308C shall be protected from direct exposure to sunlight.

BA324Cabcde - 4/20 mA Loop Powered 4 ½ Digit Indicator

IS / I, II, III / 1 / ABCDEFG / T4 Ta = 60°C; — CI320-22; Entity; Type 4

NI / I / 2 / ABCD / T4 Ta = 60°C; Type 4;

S / II, III / 2 / FG / T4 Ta = 60°C; Type 4

Entity parameters

Terminals	Vmax (V)	I _{max} (mA)	P _{max} (W)	C _i (μF)	L _i (mH)
1, 2, 3 and 4	32	200	1.2	0.02	0.01
12 and 13	32	159	1.2	0.03	0.01
8 and 9; 10 and 11	32	159	1.2	0.04	0.02

a = Display mode: linear or root extracting.

b = Display at 0 mA: XXXX.

c = Display at 20 mA: XXXX (with decimal point position and polarity).

d = Display resolution: 1, 2, 5 or 10 digits.

e = Accessories: alarms, tare function, lineariser, scale card, tag strip, pipe mounting kit, panel mounting kit.

Special conditions of use

1. The BA324C shall be protected from direct exposure to sunlight.

BA327Cabcd - 4/20 mA Loop Powered 4 ½ Digit Indicator

IS / I / 1 / ABCDEFG / T4 Ta = 60°C; — CI320-22; Entity; Type 4*

NI / I / 2 / ABCD / T4 Ta = 60°C; Type 4*;

*front panel only

Entity parameters

Terminals	Vmax (V)	I _{max} (mA)	P _{max} (W)	C _i (μF)	L _i (mH)
1, 2, 3 and 4	32	200	1.2	0.02	0.01
12 and 13	32	159	1.2	0.03	0.01
8 and 9; 10 and 11	32	159	1.2	0.04	0.02

- a = Display mode: linear or root extracting.
- b = Display at 0 mA: XXXX.
- c = Display at 20 mA: XXXX (with decimal point position and polarity).
- d = Accessories: backlight, alarms, tare function, lineariser, scale card, tag strip.

Special conditions of use

1. To maintain the Type 4 enclosure rating the BA327C shall be installed in accordance with the mounting conditions provided on drawing numbers CI320-22.
2. The BA327C shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.
3. The BA327C shall be protected from direct exposure to sunlight.

BA328Cabcd - 4/20 mA Loop Powered 4 ½ Digit Indicator

IS / I / 1 / ABCDEFG/T4 Ta = 60°C; — CI320-22; Entity; Type 4*

NI / I / 2 / ABCD/T4 Ta = 60°C; Type 4*;

*front panel only

Entity parameters

Terminals	Vmax (V)	I _{max} (mA)	P _{max} (W)	C _i (µF)	L _i (mH)
1, 2, 3 and 4	32	200	1.2	0.02	0.01
12 and 13	32	159	1.2	0.03	0.01
8 and 9; 10 and 11	32	159	1.2	0.04	0.02

- a = Display mode: linear or root extracting.
- b = Display at 0 mA: XXXX.
- c = Display at 20 mA: XXXX (with decimal point position and polarity).
- d = Accessories: alarms, tare function, lineariser, scale card, tag strip.

Special conditions of use

1. To maintain the Type 4 enclosure rating the BA328C shall be installed in accordance with the mounting conditions provided on drawing numbers CI320-22.
2. The BA328C shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.
3. The BA328C shall be protected from direct exposure to sunlight.

Equipment Ratings:

BA304C and BA324C

Intrinsically safe for Class I, II and III, Division 1, Groups A, B, C, D, E, F and G Hazardous (Classified) Locations when installed in accordance with the entity concept in accordance with Control Drawings CI300-22 and CI320-22; Nonincendive for Class I, Division 2, Groups A, B, C and D Hazardous (Classified) Locations; Suitable for Class II and III, Division 2, Groups E, F and G Hazardous (Classified) Locations. Temperature class T4 at an ambient of 60°C. Enclosure Type 4.

BA307C, BA308C, BA327C and BA328C

Intrinsically safe for Class I, Division 1, Groups A, B, C and D (Classified) Locations when installed in accordance with the entity concept in accordance with Control Drawings CI300-22 and CI320-22; Nonincendive for Class I, Division 2, Groups A, B, C and D Hazardous (Classified) Locations. Temperature class T4 at an ambient of 60°C. Enclosure Type 4 front panel only.

FM Approved for:

BEKA associates
Hitchin, Hertfordshire SG5 2DA, United Kingdom



Member of the FM Global Group

This certifies that the equipment described has been found to comply with the following Approval Standards and other documents:

Class 3600	1998
Class 3610	2010
Class 3611	2004
Class 3810	2005

Original Project ID: 4B3A7.AX

Approval Granted: September 29, 1997

Subsequent Revision Reports / Date Approval Amended

Report Number	Date	Report Number	Date
040804	May 19, 2004		
050526	June 10, 2005		
101217	March 16, 2011		

FM Approvals LLC

Timothy J. Adam
Technical Team Manager

March 16, 2011
Date

Iss.	3	Date	26.05 2005	Modification	Redown. BA307 & 308 Class II & III options removed	Ckd.		Appd.	
Iss.		Date		Modification		Ckd.		Appd.	

BEKA associates
Hitchin
England
company confidential, copyright reserved.

HAZARDOUS (CLASSIFIED) LOCATION

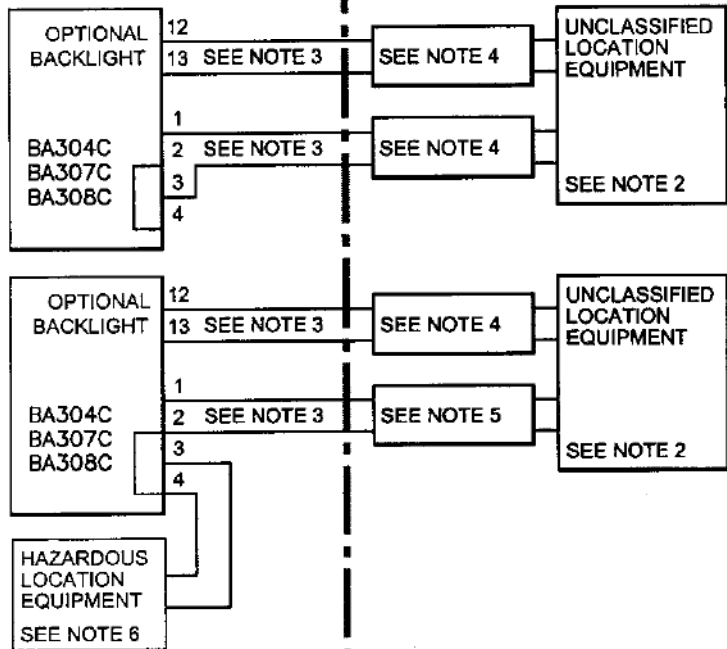
BA304C LOCATIONS:
Class I, Division 1, Groups A, B, C & D
Class II, Division 1, Groups E, F & G
Class III

BA307C & BA308C LOCATIONS:
Class I, Division 1, Groups A, B, C & D

BA304C, BA307C
or BA308C
Entity Parameters

Terminals 1, 2, 3 & 4
Vmax = 32V
Imax = 200mA
Pmax = 1.2W
Ci = 0.02µF
Li = 0.01mH

Terminals 12 & 13
Vmax = 32V
Imax = 159mA
Pmax = 1.2W
Ci = 0.03µF
Li = 0.01mH



UNCLASSIFIED LOCATION

SUB-MASTER

SEE NOTE 1

Note:

No modification to be made without reference/approval from FM Approvals and BEKA Associates Design Department.

Notes:

- The associated intrinsically safe barriers or galvanic isolators must be FM approved and the manufacturers' installation drawings must be followed when installing this equipment.
- The unclassified location equipment connected to the associated intrinsically safe barriers or galvanic isolators must not use or generate more than 250V rms or 250V dc.
- Installation should be in accordance with ANSI/ISA RP 12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code ANSI/NFPA 70.
- One single channel or one channel of a dual channel barrier or galvanic isolator with entity parameters complying with the following requirements:

Voc or Vt	equal to or less than	Vmax
Isc or It	equal to or less than	Imax
Po	equal to or less than	Pmax
La	equal to or greater than	Lcable + Li
Ca	equal to or greater than	Ccable + Ci

Title
FM Control Drawing for BA304C, 307C and 308C

Drawn RC	Checked 	Scale N/A
Drawing No. Sheet 1 of 2		C1300-22

SUN-3000-11-2

Iss.	3	Date	26.05 2005	Modification	Redawn. BA307 & 308 Class II & III options removed	Ckd.		Appd.	
Iss.		Date		Modification		Ckd.		Appd.	

BEKA associates
Hitchin
England
company confidential, copyright reserved.

5. One single channel or one channel of a dual channel barrier or galvanic isolator with entity parameters complying with the following requirements:

CAUTION: THESE REQUIREMENTS MUST BE FOLLOWED FOR NEW INSTALLATIONS OR MODIFICATIONS TO EXISTING INSTALLATIONS.

Voc or Vt	equal to or less than	The lowest Vmax of the FM Approved apparatus installed in the respective loop.
Isc or It	equal to or less than	The lowest Imax of the FM Approved apparatus installed in the respective loop.
Po	equal to or less than	Pmax
La	equal to or greater than	The sum of the cable inductances and the internal inductance Li of each FM Approved apparatus installed in the respective loop.
Ca	equal to or greater than	The sum of the cable capacitance and the internal capacitance Ci of each FM Approved apparatus in the respective loop.

6. Hazardous (classified) location equipment may be simple apparatus or FM Approved equipment with entity parameters meeting the requirements of note 5.

7. The BA304C is FM Approved as nonincendive for Class I, II, III, Division 2, Groups A, B, C, D, E, F & G Hazardous (classified) locations without connection to associated protective barriers or galvanic isolators when installed per the National Electrical Code (ANSI/NFPA 70) and the voltages do not exceed 32V dc.
The BA307C and BA308C are FM Approved as nonincendive for Class I, Division 2, Groups A, B, C & D Hazardous (classified) locations without connection to associated protective barriers or galvanic isolators when installed per the National Electrical Code (ANSI/NFPA 70) and the voltages do not exceed 32V dc.

8. When mounting BA307C and BA308C in an enclosure to maintain NEMA 4 front panel rating:

Minimum panel thickness should be 2mm (0.08inches) Steel
3mm (0.12inches) Aluminium

Outside panel finish should be smooth, free from particle inclusions, runs or build-up around cut-out.

Panel cut-out should be	BA307C	43.5 x 90.0mm -0.00 +0.5 (1.71 x 3.54 inches -0.00 +0.02)
	BA308C	66.2 x 136.0mm -0.0 +0.5 (2.60 x 5.35 inches -0.00 +0.02)

Edges of panel cut-out should be deburred and clean

Each panel mounting clip should be tightened to between: 20 and 22cNm (1.77 to 1.95 inLb)

Note: BA308C requires four panel clips.

Title
FM Control Drawing for BA304C, 307C and 308C

Drawn RC	Checked 	Scale N/A
Drawing No. Sheet 2 of 2		CI300-22

Iss.	3	Date	26.05 2005	Modification	Redawn. BA327 & 328 Class II & III options removed	Ckd.		Appd.	
Iss.		Date		Modification		Ckd.		Appd.	

BEKA associates
Hitchin England
company confidential, copyright reserved.

HAZARDOUS (CLASSIFIED) LOCATION

BA324C LOCATIONS:
Class I, Division 1, Groups A, B, C & D
Class II, Division 1, Groups E, F & G
Class III

BA327C & BA328C LOCATIONS:
Class I, Division 1, Groups A, B, C & D

BA324C, BA327C or BA328C Entity Parameters

Terminals 1, 2, 3 & 4
Vmax = 32V
Imax = 200mA
Pmax = 1.2W
Ci = 0.02µF
Li = 0.01mH

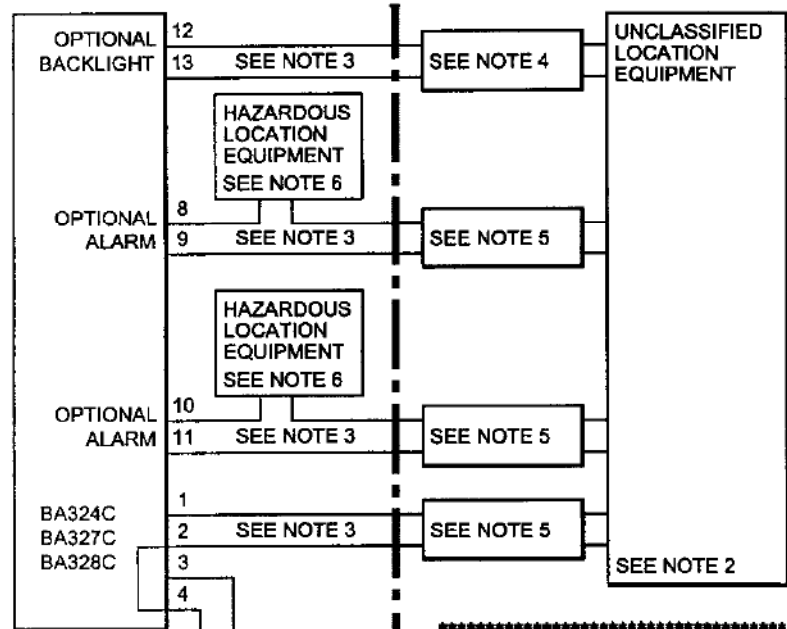
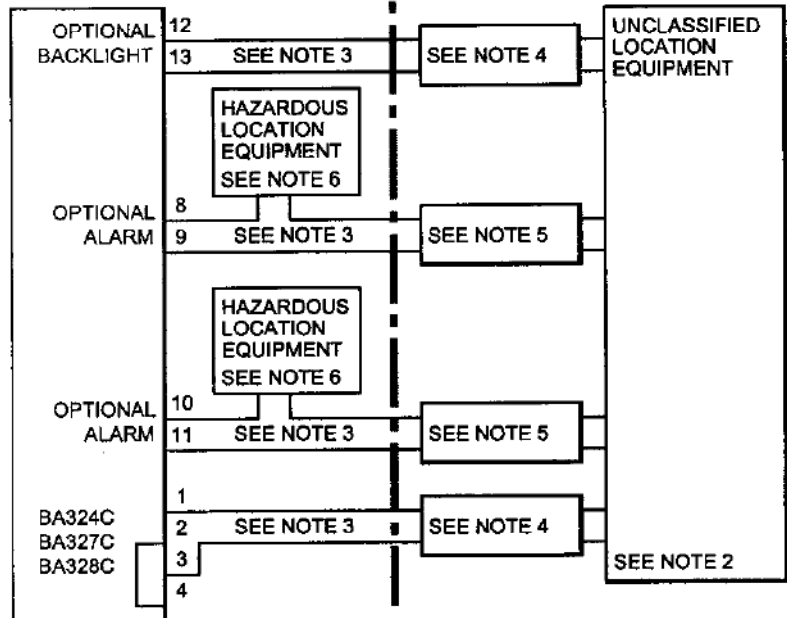
Terminals 12 & 13
Vmax = 32V
Imax = 159mA
Pmax = 1.2W
Ci = 0.03µF
Li = 0.01mH

Terminals 8 & 9 and 10 & 11
Vmax = 32V
Imax = 159mA
Pmax = 1.2W
Ci = 0.04µF
Li = 0.02mH

UNCLASSIFIED LOCATION

SUB-MASTER

SEE NOTE 1



Note:
No modification to be made without reference/approval from FM Approvals and BEKA Associates Design Department.

Title
FM Control Drawing for BA324C, 327C and 328C

Drawn	RC	Checked	Scale
			N/A
Drawing No.		CI320-22	
Sheet 1 of 3			

300-MASTER

Iss.	3
Date	26.05 2005
Modification	Redawn. BA327 & 328 Class II & III options removed
Ckd.	
Appd.	
Iss.	
Date	
Modification	
Ckd.	
Appd.	

BEKA associates
Hitchin
England
company confidential, copyright reserved.

Notes:

1. The associated intrinsically safe barriers or galvanic isolators must be FM approved and the manufacturers' installation drawings must be followed when installing this equipment.
2. The unclassified location equipment connected to the associated intrinsically safe barriers or galvanic isolators must not use or generate more than 250V rms or 250V dc.
3. Installation should be in accordance with ANSI/ISA RP 12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code ANSI/NFPA 70.
4. One single channel or one channel of a dual channel barrier or galvanic isolator with entity parameters complying with the following requirements:

Voc or Vt	equal to or less than	Vmax
Isc or It	equal to or less than	Imax
Po	equal to or less than	Pmax
La	equal to or greater than	Lcable + Li
Ca	equal to or greater than	Ccable + Ci

5. One single channel or one channel of a dual channel barrier or galvanic isolator with entity parameters complying with the following requirements:

CAUTION: THESE REQUIREMENTS MUST BE FOLLOWED FOR NEW INSTALLATIONS OR MODIFICATIONS TO EXISTING INSTALLATIONS.

Voc or Vt	equal to or less than	The lowest Vmax of the FM Approved apparatus installed in the respective loop.
Isc or It	equal to or less than	The lowest Imax of the FM Approved apparatus installed in the respective loop.
Po	equal to or less than	Pmax
La	equal to or greater than	The sum of the cable inductances and the internal inductance Li of each FM Approved apparatus installed in the respective loop.
Ca	equal to or greater than	The sum of the cable capacitance and the internal capacitance Ci of each FM Approved apparatus in the respective loop.

6. Hazardous (classified) location equipment may be simple apparatus or FM Approved equipment with entity parameters meeting the requirements of note 5.
7. The BA324C is FM Approved as nonincendive for Class I, II, III, Division 2, Groups A, B, C, D, E, F & G Hazardous (classified) locations without connection to associated protective barriers or galvanic isolators when installed per the National Electrical Code (ANSI/NFPA 70) and the voltages do not exceed 32V dc.
The BA327C and BA328C are FM Approved as nonincendive for Class I, Division 2, Groups A, B, C & D Hazardous (classified) locations without connection to associated protective barriers or galvanic isolators when installed per the National Electrical Code (ANSI/NFPA 70) and the voltages do not exceed 32V dc.

Title
FM Control Drawing for BA324C, 327C and 328C

Drawn RC	Checked 	Scale N/A
Drawing No. Sheet 2 of 3 CI320-22		

SECRET

Iss.	3	Date	26.05 2005	Modification	Redawn. BA327 & 328 Class II & III options removed	Ckd.		Appd.	
Iss.		Date		Modification		Ckd.		Appd.	

BEKA
Hitchin
company confidential, copyright reserved.

8. When mounting BA327C and BA328C in an enclosure to maintain NEMA 4 front panel rating:

Minimum panel thickness should be 2mm (0.08inches) Steel
3mm (0.12inches) Aluminium

Outside panel finish should be smooth, free from particle inclusions, runs or build-up around cut-out.

Panel cut-out should be	BA327C	43.5 x 90.0mm -0.00 +0.5 (1.71 x 3.54 inches -0.00 +0.02)
	BA328C	66.2 x 136.0mm -0.0 +0.5 (2.60 x 5.35 inches -0.00 +0.02)

Edges of panel cut-out should be deburred and clean

Each panel mounting clip should be tightened to between: 20 and 22cNm (1.77 to 1.95 inLb)

Note: BA328C requires four panel clips.

Iss.	Date			Title			Drawn	Checked	Scale
	26.05 2005			FM Control Drawing for BA324C, 327C and 328C			RC		N/A
							Drawing No. Sheet 3 of 3 C1320-22		