FM Approvals
Member of the FM Global Group

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# CERTIFICATE OF COMPLIANCE

## HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment:

***BA405C Setpoint Display***
IS / I / 1 / ABCD / T4 Ta = 60°C – CI405-27; Entity; IP65
NI / I / 2 / ABCD / T4 Ta = 60°C – CI405-27; NIFW; IP65

Intrinsic Safety Parameters
Input Parameters

| Terminals | Ui (V) | Ii (mA) | Pi (W) | Ci (µF) | Li (mH) |
|---|---|---|---|---|---|
| 1 & 3; 1 & 2; 1 & 13 | 30 | 200 | 0.85 | 0.04 | 0.01 |
| 12 & 13 | 28 | 159 | 0.8 | 0.03 | 0.01 |

Output Parameters

| Terminals | Uo (V) | Io (mA) | Po (W) | Co (µF) | Lo (mH) |
|---|---|---|---|---|---|
| 3 & 4 | 30 | 200 | 0.85 | 0.026 | 0.99 |

a = Parameter not affecting safety.

*Special conditions of use*
*1. To maintain the IP65 enclosure rating the BA405C shall be installed in accordance with the mounting conditions provided on drawing number CI405-27.*
*2. The BA405C shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.*
*3. The BA405C shall be protected from direct exposure to sunlight.*

Equipment Ratings:

Intrinsically safe for Class I Division 1 Groups A, B, C and D and Class I Zone 1 Group IIC Hazardous (Classified) Locations using the Entity Concept when installed in accordance with Control Drawing CI405-27

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Nonincendive for Class I Division 2 Groups A, B, C and D and Class I Zone 2 Group IIC Hazardous (Classified) Locations using the nonincendive field wiring concept when installed in accordance with Control Drawing CI405-27.

## FM Approved for:

BEKA associates
Hitchin, Hertfordshire SG5 2DA, United Kingdom

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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 |
| IEC 60529 | 1991 |

Original Project ID: 3026081 Approval Granted: January 19, 2007

Subsequent Revision Reports / Date Approval Amended

| Report Number | Date | Report Number | Date |
|---|---|---|---|
| 101217 | March 16, 2011 | | |

FM Approvals LLC

Timothy J Adam
Technical Team Manager

March 16, 2011
Date

# INTRINSICALLY SAFE INSTALLATIONS

## HAZARDOUS (CLASSIFIED) LOCATION

LOCATION:
Class I, Division 1, Groups A, B,C & D

BA405C
Entity Parameters

Terminals 1 & 3; 1 & 2
Ui = 30V
Ii = 200mA
Pi = 0.85W
Ci = 0.04µF
Li = 0.01mH

Terminals 3 & 4
Uo = 30V
Io = 200mA
Po = 0.85W
Co = 0.26µF
Lo = 0.99mH

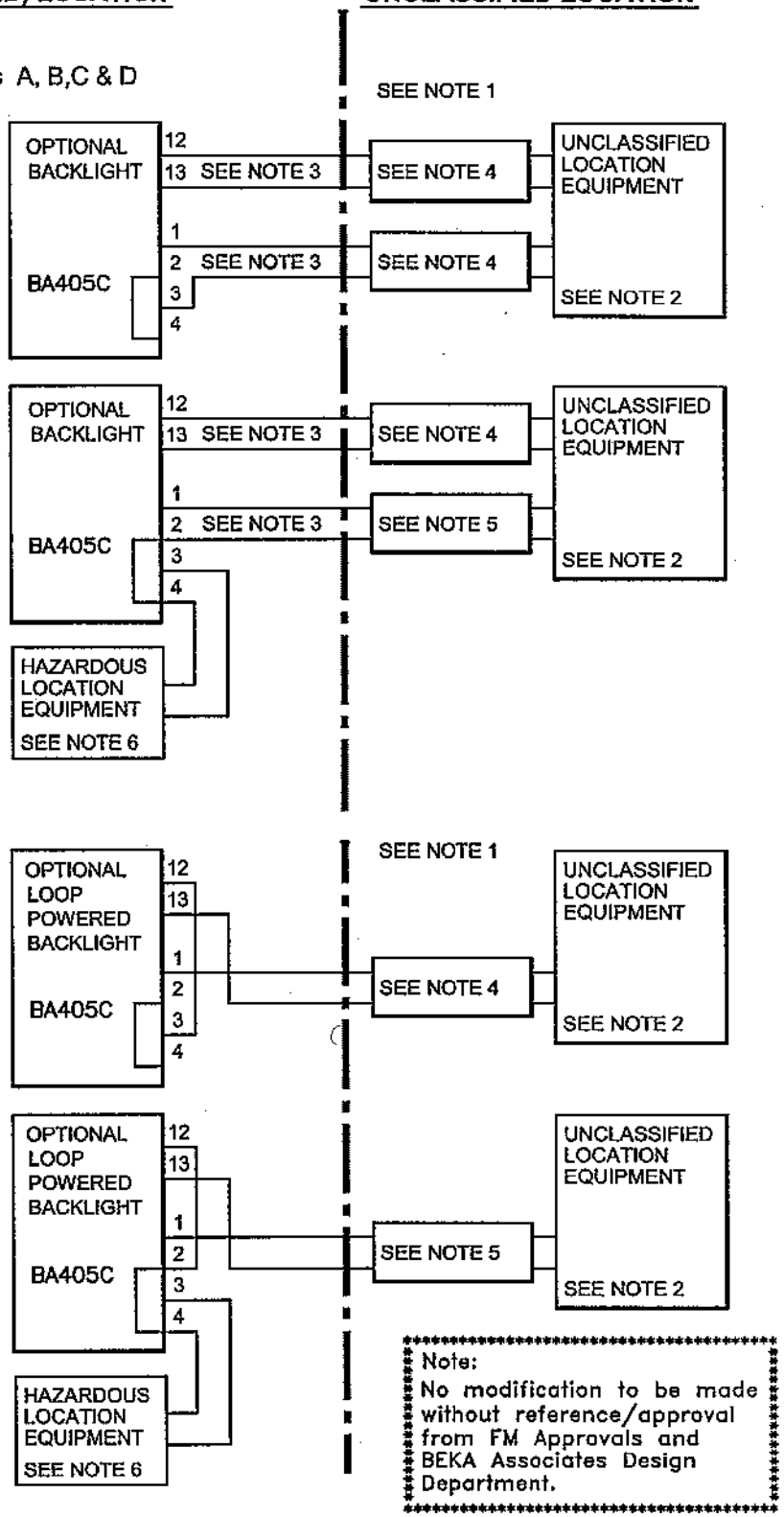
Terminals 12 & 13
Ui = 28V
Ii = 159mA
Pi = 0.8W
Ci = 0.03µF
Li = 0.01mH

BA405C
Entity Parameters

Terminals 1 & 13;
12 & 13
Ui = 30V
Ii = 200mA
Pi = 0.85W
Ci = 0.04µF
Li = 0.01mH

Terminals 3 & 4
Uo = 30V
Io = 200mA
Po = 0.85W
Co = 0.26µF
Lo = 0.99mH

## UNCLASSIFIED LOCATION




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

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.

| Iss. | Date | Modification | Ckd. | Appd. |
|---|---|---|---|---|
| 1 | 10.01 2006 | First release | - | - |

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Title: FM Control Drawing for BA405C

| Drawn | Checked | Scale |
|---|---|---|
| RC | | N/A |

Drawing No. Sheet 1 of 4 CI405–27

File CI405–27s1.dwg 04.12.06

| Iss. | Date | Modification | Ckd. | Appd. |
|---|---|---|---|---|
| 1 | 10.01 2006 | First release | · | · |

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:

| | | |
|---|---|---|
| Uo or Vt | equal to or less than | Ui |
| Io or It | equal to or less than | Ii |
| Po | equal to or less than | Pi |
| 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 REQUIREMEENTS MUAT 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. When mounting BA405C in an enclosure to maintain IP65 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 43.5 x 90.0mm -0.00 +0.5
(1.71 x 3.54 inches -0.00 +0.02)
Edges of panel cut-out should be deburred and clean
Each panel mounting clip should be tighened to between: 20 and 22cNm (1.77 to 1.95 inLb)

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Title

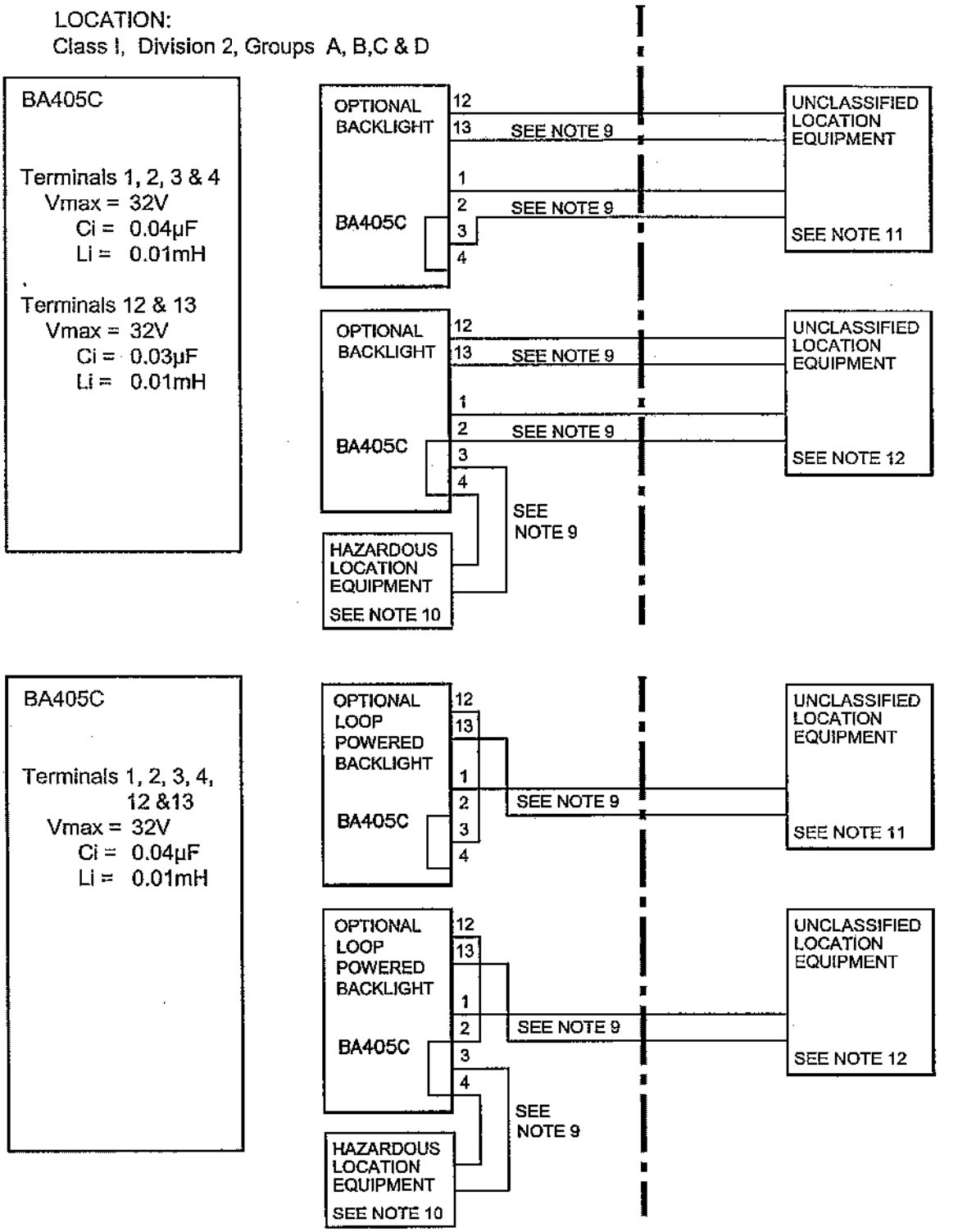
# FM Control Drawing for BA405C

| Drawn | Checked | Scale |
|---|---|---|
| RC | | N/A |

Drawing No. CI405–27
Sheet 2 of 4

File CI405–27s2.dwg 04.12.06

# NONINCENDIVE INSTALLATIONS

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| Iss. | Date | Modification | Ckd. | Appd. |
|---|---|---|---|---|
| 1 | 10.01 2006 | First release | . | . |

Title

FM Control Drawing for BA405C

| Drawn | Checked | Scale |
|---|---|---|
| RC | | N/A |

Drawing No. CI405–27
Sheet 3 of 4

File CI405–27s3.dwg 02.11.06

8. The BA405C is FM Approved as Nonincendive Field Wiring Apparatus for Class I, Division 2, Groups A, B, C and D Hazardous (Classified) locations without connection to associated protective barriers or galvanic isolators when installed per the National Electrical Code ANSI/NFPA 70.

9. Nonincendive field wiring installations shall be in accordance with the National Electrical Code ANSI/NFPA 70. The Nonincendive Field Wiring concept allows interconnection of Nonincendive Field Wiring Apparatus with Associated Nonincendive Field Wiring Apparatus using any of the wiring methods permitted for unclassified locations.

10. Hazardous location equipment must be FM Approved Nonincendive Field Wiring Apparatus or simple apparatus, as defined in ANSI/NFPA 70.

11. Associated apparatus shall be FM Approved Associated Nonincendive Field Wiring Apparatus installed in the unclassified location with parameters complying with the following requirements, or FM Approved Nonincendive Field Wiring Apparatus with nonincendive field wiring output(s) installed in the classified location complying with the following requirements:

| | | |
|---|---|---|
| Voc | equal to or less than | Vmax |
| La | equal to or greater than | Lcable + Li |
| Ca | equal to or greater than | Ccable + Ci |

12. Associated apparatus shall be FM Approved Associated Nonincendive Field Wiring Apparatus installed in the unclassified location with parameters complying with the following requirements, or FM Approved Nonincendive Field Wiring Apparatus with nonincendive field wiring output(s) installed in the classified location complying with the following requirements:

| | | |
|---|---|---|
| Voc | equal to or less than | The lowest Vmax of the FM Approved apparatus installed In the respective loop. |
| La | equal to or greater than | Sum of the cable inductances and internal inductances Li of each FM Approved apparatus installed in the respective loop. |
| Ca | equal to or greater than | Sum of the cable capacitance and the internal capacitance Ci of each FM Approved apparatus in the respective loop. |

| Iss. | Date | Modification | Ckd. | Appd. |
|---|---|---|---|---|
| 1 | 10.01 2006 | First release | . | . |

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Title: FM Control Drawing for BA405C

Drawn: RC | Checked | Scale: N/A

Drawing No. Sheet 4 of 4: CI405–27

File CI405–27s4.dwg 03.11.06