

CERTIFICATE OF COMPLIANCE

HAZARDOUS LOCATION ELECTRICAL EQUIPMENT PER CANADIAN REQUIREMENTS

This certificate is issued for the following equipment:

BA484Da Serial Text Display

IS / I,II,III / 1 / ABCDEFG / T4 Ta = 60°C – CI480-07; Entity; IP66, Type 4X

I / 0 / Ex ia / IIC T4 Ta = 60°C – CI480-07; Entity; IP66, Type 4X

IPA / I,II,III / 2 / ABCDEFG / T4 Ta = 60°C – CI480-08; IP66, Type 4X

I / 2 / IIC / T4 Ta = 60°C – CI480-08; NIFW; IP66, Type 4X

Entity Parameters

Input Parameters

Terminals	Ui (V)	Ii (mA)	Pi (W)	Ci (μF)	Li (mH)
1 & 2	25	108	0.58	0.01	0.02
4 & 2	14	108	0.45	0	0
1, 2, 5 & 6	20	139	0.46	0.01	0.02
S1 to S7	0	0	0	0.54	0.3
A1 & A2; A3 & A4	28	200	0.85	0.04	0.02

Output Parameters

Terminals	Uo (V)	Io (mA)	Po (W)	Co (μF)	Lo (mH)
S1 to S7	14.7	146.7	0.58	0.08	1.1
A1 & A2; A3 & A4	1.49	0.0001	0.003	1000	1000

Nonincendive Field Wiring Parameters

Input Parameters

Terminals	Ui (V)	Ii (mA)	Pi (W)	Ci (μF)	Li (mH)
1 & 2	25	-	-	0.01	0.02
4 & 2	14	-	-	0	0
1, 2, 5 & 6	20	-	-	0.01	0.02
A1 & A2; A3 & A4	32	-	-	0.04	0.02

Output Parameters

Terminals	Uo (V)	Io (mA)	Po (W)	Co (μF)	Lo (mH)
S1 to S7	14.7	146.7	-	0.08	1.1

a = Parameter not affecting safety.

Special conditions of use

1. The BA484D shall be protected from direct exposure to sunlight.

BA488Ca Serial Text Display

IS / I / 1 / ABCD / T4 Ta = 60°C – CI480-07; Entity; Type 4X*; IP66*
 I / 0 / Ex ia / IIC T4 Ta = 60°C – CI480-07; Entity; Type 4X*; IP66*
 IPA / I / 2 / ABCD / T4 Ta = 60°C – CI480-08; NIFW; Type 4X*; IP66*
 I / 2 / IIC / T4 Ta = 60°C – CI480-08; NIFW; Type 4X*; IP66*
 *Front panel only

Entity Parameters

Input Parameters

Terminals	Ui (V)	Ii (mA)	Pi (W)	Ci (μF)	Li (mH)
1 & 2	25	108	0.58	0.01	0.02
4 & 2	14	108	0.45	0	0
1, 2, 5 & 6	20	139	0.46	0.01	0.02
S1 to S7	0	0	0	0.54	0.3
A1 & A2; A3 & A4	28	200	0.85	0.04	0.02

Output Parameters

Terminals	Uo (V)	Io (mA)	Po (W)	Co (μF)	Lo (mH)
S1 to S7	14.7	146.7	0.58	0.08	1.1
A1 & A2; A3 & A4	1.49	0.0001	0.003	1000	1000

Nonincendive Field Wiring Parameters

Input Parameters

Terminals	Ui (V)	Ii (mA)	Pi (W)	Ci (μF)	Li (mH)
1 & 2	25	-	-	0.01	0.02
4 & 2	14	-	-	0	0
1, 2, 5 & 6	20	-	-	0.01	0.02
A1 & A2; A3 & A4	32	-	-	0.04	0.02

Output Parameters

Terminals	Uo (V)	Io (mA)	Po (W)	Co (μF)	Lo (mH)
S1 to S7	14.7	146.7	-	0.08	1.1

a = Parameter not affecting safety.

Special conditions of use

1. To maintain the Type 4X enclosure rating the BA488C shall be installed in accordance with the mounting conditions provided on drawing numbers CI480-07 and CI480-08.
2. The BA488C shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.
3. The BA488C shall be protected from direct exposure to sunlight

Equipment Ratings:

BA484Da Serial Text Display

Intrinsically Safe for Class I, II and III, Division 1, Groups A, B, C, D, E, F and G; and Class I, Zone 0, Group IIC Hazardous (Classified) Locations using the Entity Concept when installed in accordance with Control Drawing CI480-07.

Ignition Protected Apparatus 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 CI480-08.

Ignition Protected Apparatus for Class II, Division 2, Groups E, F and G Hazardous (Classified) Locations using the Nonincendive Field Wiring Concept when installed in accordance with Control Drawing CI480-08.

Ignition Protected Apparatus for Class III, Division 2, Hazardous (Classified) Locations using the Nonincendive Field Wiring Concept when installed in accordance with Control Drawing CI480-08.

BA488Ca Serial Text Display

Intrinsically Safe for Class I, Division 1, Groups A, B, C, and D; and Class I, Zone 0, Group IIC Hazardous (Classified) Locations using the Entity Concept when installed in accordance with Control Drawing CI480-07

Ignition Protected Apparatus 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 CI480-08.

FM Approved for:

BEKA associates
Hitchin, Hertfordshire SG5 2DA United Kingdom

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

CSA-C22.2 No 157	1992
CSA C22.2 No. 25	1966
CSA C22.2 No. 213	1987
CSA C22.2 No. 94.02	2007
CSA-C22.2 No.60079-0	2002
CSA-E60079-11-02	2002
CSA C22.2 No. 1010.1	1992
CSA-C22.2 No 60529	2005

Original Project ID: 3025514

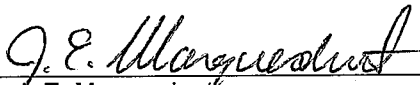
Canadian Project ID: 3032633

Approval Granted: May 28, 2008

Subsequent Revision Reports / Date Approval Amended

Report Number	Date	Report Number	Date
080616	August 11, 2008		

FM Approvals LLC



J. E. Marquedant
Group Manager, Electrical

11 August 2008
Date



Iss.	1	2
Date	03/05 2006	01/08
Modification	First release	CFM requirements added.
Ckd.		
Appd.		
Iss.		
Date		
Modification		
Ckd.		
Appd.		

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HAZARDOUS (CLASSIFIED) LOCATION

BA484D LOCATIONS:
Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F & G
Class III
Class I, Zone 0, Group IIC

BA488C LOCATIONS:
Class I, Division 1, Groups A, B, C, D
Class I, Zone 0, Group IIC

BA484D and BA488C Entity Parameters

Terminals 1 & 2
 $U_i = 25V$ dc
 $I_i = 108mA$
 $P_i = 0.58W$
 $C_i = 0.01\mu F$
 $L_i = 0.02mH$

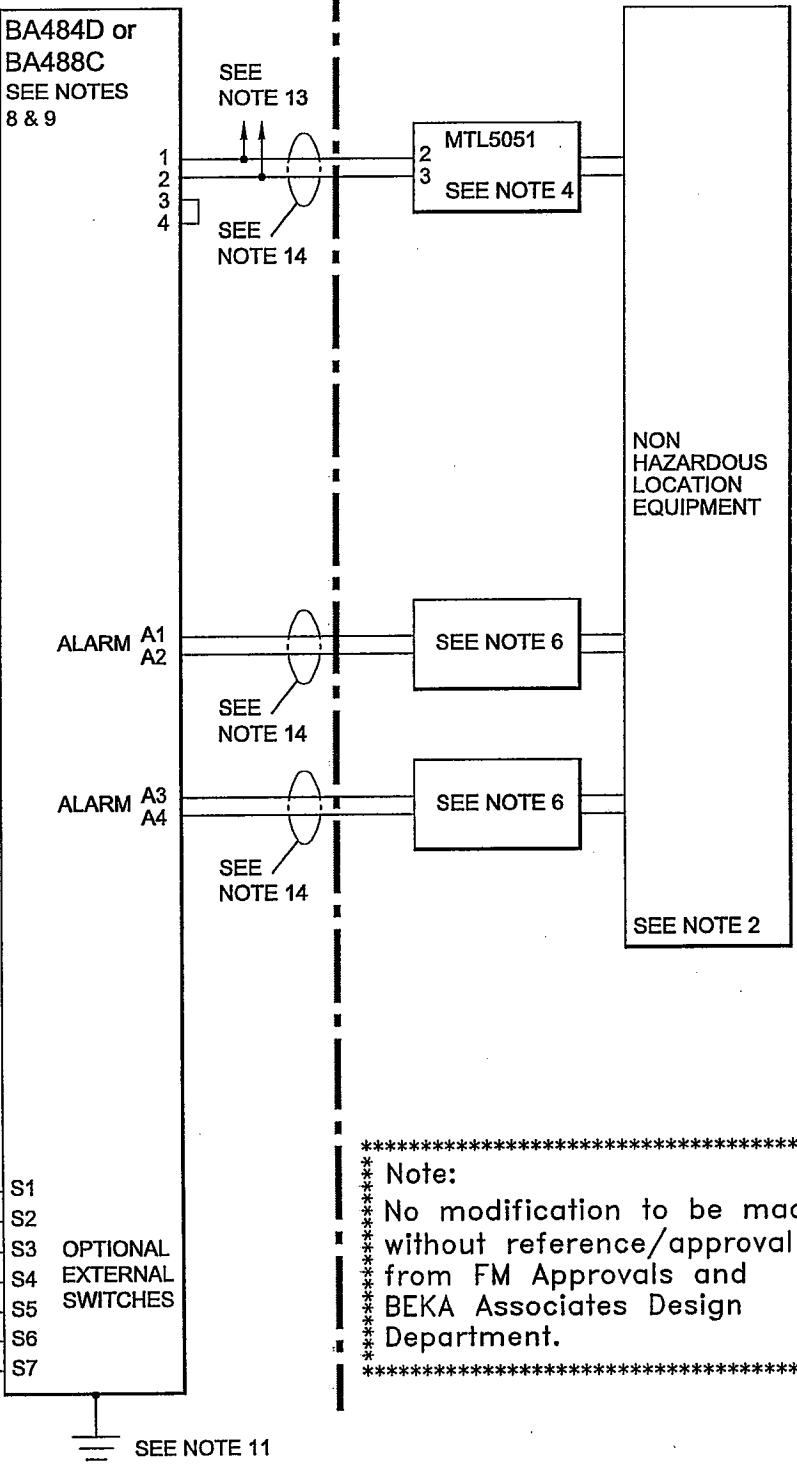
Terminals S1 to S7 (combined parameters)
 $U_i = 0$ $U_o = 14.7V$ dc
 $I_i = 0$ $I_o = 146.7mA$ dc
 $P_i = 0$ $P_o = 0.58W$
 $C_i = 0.54\mu F$ $C_o = 0.08\mu F$
 $L_i = 0.3mH$ $L_o = 1.1mH$

Terminals A1 & A2; A3 & A4;
 $U_i = 28V$ dc $U_o = 1.49V$ dc
 $I_i = 200mA$ dc $I_o = 1\mu A$ dc
 $P_i = 0.85W$ $P_o = 3\mu W$
 $C_i = 0.04\mu F$ $C_o = 1000\mu F$
 $L_i = 0.02mH$ $L_o = 1000mH$

UNCLASSIFIED LOCATION

SUB-MASTER

SEE NOTE 1



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

Two Wire System

Iss.	Date	03/05 2006	Title	Drawn	Checked	Scale
	01/08	First release		RC		NTS
	Modification	CFM requirements added.	FM Approvals Control Drawing for Intrinsically Safe BA484D & BA488C Serial Text Displays	Drawing No. Sheet 1 of 5 CI480-07		

Iss.	Date	Modification	Ckd.	Appd.
1	03/05/2006	First release		
2	01/08	CFM requirements added.		

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HAZARDOUS (CLASSIFIED) LOCATION

BA484D LOCATIONS:
Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F & G
Class III
Class I, Zone 0, Group IIC

BA488C LOCATIONS:
Class I, Division 1, Groups A, B, C, D
Class I, Zone 0, Group IIC

BA484D and BA488C Entity Parameters

Terminals 1, 2, 5 & 6
 $U_i = 20V$ dc
 $I_i = 139mA$
 $P_i = 0.46W$
 $C_i = 0.01\mu F$
 $L_i = 0.02mH$

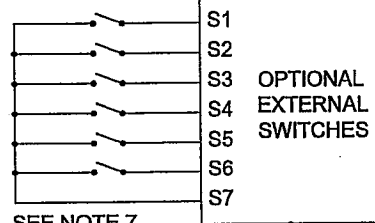
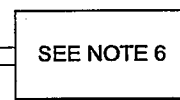
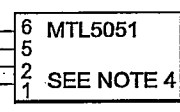
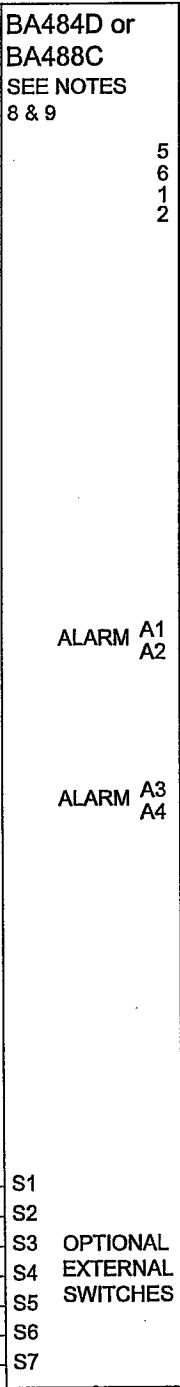
Terminals S1 to S7 (combined parameters)
 $U_i = 0$ $U_o = 14.7V$ dc
 $I_i = 0$ $I_o = 146.7mA$ dc
 $P_i = 0$ $P_o = 0.58W$
 $C_i = 0.54\mu F$ $C_o = 0.08\mu F$
 $L_i = 0.3mH$ $L_o = 1.1mH$

Terminals A1 & A2; A3 & A4;
 $U_i = 28V$ dc $U_o = 1.49V$ dc
 $I_i = 200mA$ dc $I_o = 1\mu A$ dc
 $P_i = 0.85W$ $P_o = 3\mu W$
 $C_i = 0.04\mu F$ $C_o = 1000\mu F$
 $L_i = 0.02mH$ $L_o = 1000mH$

UNCLASSIFIED LOCATION

SUB-MASTER

SEE NOTE 1



Four Wire System

SEE NOTE 11

Title
FM Approvals Control Drawing for
Intrinsically Safe BA484D & BA488C Serial Text Displays

Drawn RC	Checked	Scale NTS
Drawing No. Sheet 3		CI480-07

SUB-MASTER

Notes:

1. The associated intrinsically safe barriers must be FM approved and the manufacturers' installation drawings shall be followed when installing this equipment.
For installations in Canada the associated intrinsically safe barriers and galvanic isolators must be CFM or CSA approved and the manufacturers' installation drawings shall be followed when installing the equipment.
2. The unclassified location equipment connected to the associated intrinsically safe barriers or galvanic isolators shall not use or generate more than 250V rms or 250V dc.
3. Installation shall 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. Installations in Canada shall be in accordance with the Canadian Electrical Code C22.2
4. MTL5051 Serial-Data Communications Isolator FM File J.I. 3000682 CSA certificate 1000852
5. MTL5025 Solenoid / Alarm Driver FM File J.I. 3Z9A8.AX CSA certificate 1547041
6. One single channel or one channel of a dual channel associated intrinsically safe barrier or galvanic isolator with entity parameters complying with the following requirements:

Vo or Vt	equal to or less than	Vi
Io or It	equal to or less than	Ii
La	equal to or greater than	Lcable + Li
Ca	equal to or greater than	Ccable + Ci

7. Hazardous (classified) location equipment may be simple apparatus e.g. mechanically activated switches or FM, CFM or CSA Approved equipment with entity parameters complying with following requirements:

Vo or Vt	equal to or less than	Vi
Io or It	equal to or less than	Ii
La	equal to or greater than	Lcable + Li
Ca	equal to or greater than	Ccable + Ci

8. To maintain IP66 protection between the BA488C and the mounting panel:

Four panel mounting clips should be used

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 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)

Iss.	Date	Modification	Ckd.	Appd.
1	03/05 2008	First release		
2	01/08	CFM requirements added.		

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Title	Drawn	Checked	Scale
FM Approvals Control Drawing for Intrinsically Safe BA484D & BA488C Serial Text Displays	RC		NTS
	Drawing No. Sheet 4		CI480-07

SUB - MASTER

9. When installed in a hazardous (classified) location the BA484D Serial Text Display shall be fitted with cable glands / conduit hubs selected from the following table

Metallic glands and hubs must be grounded - see note 10.

Class	Permitted gland or conduit hub
Class I	Any metallic or plastic cable gland or conduit hub that provides the required environmental protection.
Class II and III	<p>Crouse - Hinds Myler hubs ST-1 STA-1 SSTG-1 STG-1 STAG-1 MHUB-1 HUB 1</p> <p>O-Z / Gedrey Hubs CHM-50DT CHMG-50DT</p> <p>Killark Glands CMCXAA050 MCR050 MCX050</p>

10. In addition to the supplied bonding plate, when metallic 2 or 3 glands or conduit hubs are fitted to a BA484D Serial Text Display, all metallic glands or conduit hubs must be connected together and grounded.
11. **WARNING:** The BA484D and BA488C Serial Text Display are manufactured from conductive plastic per Article 250 of the National Electrical Code the enclosures shall be grounded using the 'E' terminal on the terminal block.
12. Up to four BA484D and/or BA488C Serial Text Displays may be connected to one system.
13. Up to two BA484D and/or BA488C Serial Text Displays may be connected to one system.
14. Separate intrinsically safe circuit wiring shall comply with either:
- a. All conductors of each circuit shall be within a grounded metal shield.
 - b. The conductors of each intrinsically safe circuit shall have insulation with a minimum thickness of 0.25mm (0.01in).

Iss.	Date	Modification	Ckd.	Appd.
1	03.05 2006	First release	.	.
2	01/08	CFM requirements added.	.	.

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Title	Drawn	Checked	Scale
FM Approvals Control Drawing for Intrinsically Safe BA484D & BA488C Serial Text Displays	RC		NTS
	Drawing No. Sheet 5		CI480-07



SUB-MASTER

HAZARDOUS (CLASSIFIED) LOCATION

UNCLASSIFIED LOCATION

BA484D LOCATIONS:

Class I, Division 2, Groups A, B, C, D
 Class II, Division 2, Groups E, F & G
 Class III
 Class I, Zone 2, Group IIC

BA488C LOCATIONS:

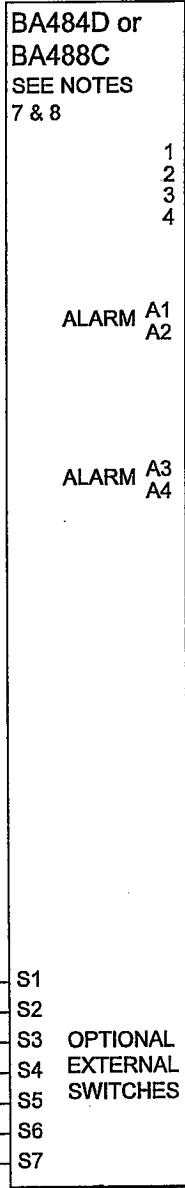
Class I, Division 2, Groups A, B, C, D
 Class I, Zone 2, Group IIC

BA484D and BA488C Maximum input and output Parameters

Terminals 1 & 2
 $V_{max} = 25V$ dc
 $C_i = 0.01\mu F$
 $L_i = 0.02mH$

Terminals S1 to S7
 (combined parameters)
 $V_{max} = 0$ $V_{oc} = 14.7V_{dc}$
 $I_{sc} = 146.7mA_{dc}$
 $C_o = 0.08\mu F$
 $L_o = 1.1mH$

Terminals A1 & A2; A3 & A4;
 $V_{max} = 32V$ dc
 $C_i = 0.04\mu F$
 $L_i = 0.02mH$



SEE NOTE 2

SEE NOTE 11

BA484D or
 BA488C
 SEE NOTES
 7 & 8

2 MTL5051
 3 SEE NOTE 3

SEE NOTE 5

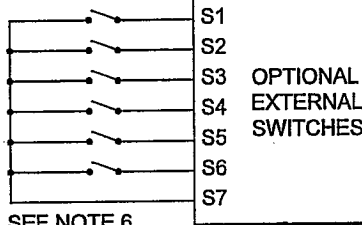
ALARM A1
A2

SEE NOTE 5

ALARM A3
A4

NON
 HAZARDOUS
 LOCATION
 EQUIPMENT

SEE NOTE 1



SEE NOTE 10

Two Wire System

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

Iss.	Date	Modification	Appd.	Ckd.	Appd.
1	01/03 2006	First release			
2	01/08	CFM requirements added.			

Title
 FM Approvals Control Drawing for
 Nonincendive BA484D & BA488C Serial Text Displays

Drawn RC	Checked	Scale NTS
Drawing No. Sheet 1 of 5		C1480-08



Iss.	1	Date	01/03 2006	Modification	First release	Appd.		Ckd.	
Iss.	2	Date	01/08	Modification	CFM requirements added.	Appd.		Ckd.	

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HAZARDOUS (CLASSIFIED) LOCATION

BA484D LOCATIONS:
Class I, Division 2, Groups A, B, C, D
Class II, Division 2, Groups E, F & G
Class III
Class I, Zone 2, Group IIC

BA488C LOCATIONS:
Class I, Division 2, Groups A, B, C, D
Class I, Zone 2, Group IIC

**BA484D and BA488C
Maximum input and
output Parameters**

Terminals 1 & 2
Vmax = 25V dc
Ci = 0.01µF
Li = 0.02mH

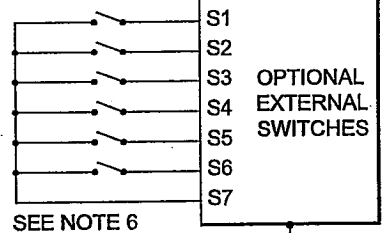
Terminals 4 & 2
Vmax = 14V dc
Ci = 0
Li = 0

Terminals S1 to S7
(combined parameters)
Vmax = 0 Voc = 14.7Vdc
Isc = 146.7mA dc
Co = 0.08µF
Lo = 1.1mH

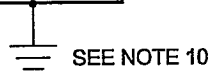
Terminals A1 & A2; A3 & A4;
Vmax = 32V dc
Ci = 0.04µF
Li = 0.02mH

SUB-MASTER

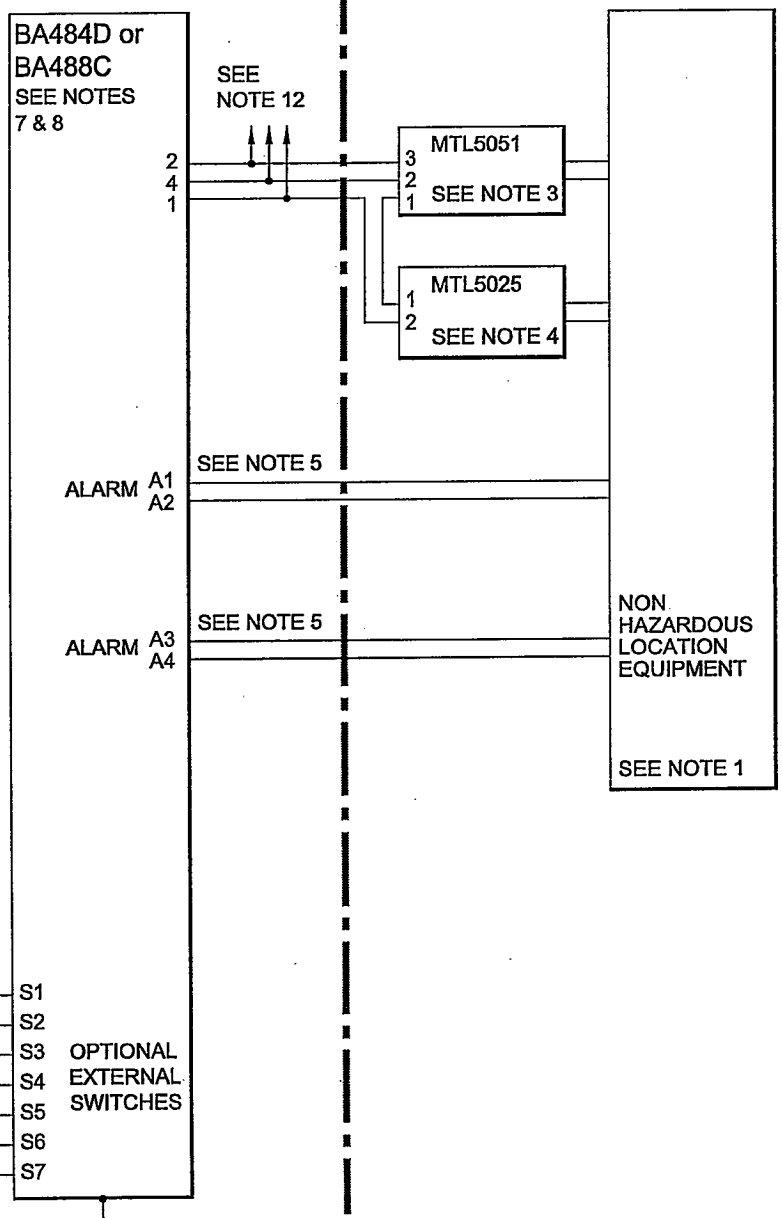
UNCLASSIFIED LOCATION



SEE NOTE 6



Three Wire System



Title

FM Approvals Control Drawing for
Nonincendive BA484D & BA488C Serial Text Displays

Drawn	Checked	Scale
RC		NTS
Drawing No.		CI480-08
Sheet 2		



SUB-MASTER

HAZARDOUS (CLASSIFIED) LOCATION

UNCLASSIFIED LOCATION

BA484D LOCATIONS:

Class I, Division 2, Groups A, B, C, D
 Class II, Division 2, Groups E, F & G
 Class III
 Class I, Zone 2, Group IIC

BA488C LOCATIONS:

Class I, Division 2, Groups A, B, C, D
 Class I, Zone 2, Group IIC

SEE
NOTE 2

BA484D and BA488C Maximum input and output Parameters

Terminals 1, 2, 5 & 6
 $V_{max} = 20V$ dc
 $C_i = 0.01\mu F$
 $L_i = 0.02mH$

Terminals S1 to S7
 (combined parameters)
 $V_{max} = 0$ $V_{oc} = 14.7Vdc$
 $I_{sc} = 146.7mAdc$
 $C_o = 0.08\mu F$
 $L_o = 1.1mH$

Terminals A1 & A2; A3 & A4;
 $V_{max} = 32V$ dc
 $C_i = 0.04\mu F$
 $L_i = 0.02mH$

BA484D or
BA488C
SEE NOTES
7 & 8

5
6
1
2

6 MTL5051
5
2
1 SEE NOTE 3

ALARM A1
A2

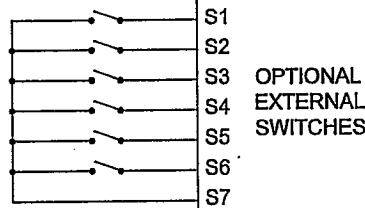
SEE NOTE 5

ALARM A3
A4

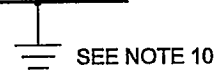
SEE NOTE 5

NON
HAZARDOUS
LOCATION
EQUIPMENT

SEE NOTE 1



SEE NOTE 6



Four Wire System

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Iss.	Date	Modification	Ckd.	Appd.
1	01/03 2006	First release		
2	01/08	CFM requirements added.		

Title
 FM Approvals Control Drawing for
 Nonincendive BA484D & BA488C Serial Text Displays

Drawn RC	Checked	Scale NTS
Drawing No. Sheet 3		C1480-08

SUB - MASTER

Notes:

1. The unclassified location equipment connected to the associated nonincendive field wiring apparatus must not use or generate more than 250V rms or 250V dc.

2. 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. Installations in Canada shall be in accordance with the Canadian Electrical Code C22.2

3. FM & CSA Approved MTL5051 Serial-Data Communications Isolator installed in the unclassified location.

4. FM & CSA Approved MTL5025 Solenoid / Alarm Driver installed in the unclassified location.

5. Apparatus connected to the alarm contacts shall be FM, CFM or CSA Approved as Associated Nonincendive Field Wiring Apparatus and shall comply 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

6. Terminals S1 to S7 shall be connected to simple apparatus or volt free contacts of FM, CFM or CSA Approved Nonincendive Field Wiring Apparatus or FM, CFM or CSA Approved Associated Nonincendive Field Wiring Apparatus installed using Division 2 wiring methods.

7. To maintain IP66 protection between the BA488C and the mounting panel:

Four panel mounting clips should be used

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 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)

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1	01/03/2006	First release		
2	01/08	CFM requirements added.		

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Title FM Approvals Control Drawing for Nonincendive BA484D & BA488C Serial Text Displays	Drawn RC	Checked	Scale NTS
Drawing No. Sheet 4		CI480-08	

SUB-MASTER

8. When installed in a hazardous (classified) location the BA484D Serial Text Display shall be fitted with cable glands / conduit hubs selected from the following table.

Metallic glands and hubs must be grounded - see note 9.

Class	Permitted gland or conduit hub
Class I	Any metallic or plastic cable gland or conduit hub that provides the required environmental protection.
Class II and III	<p>Crouse - Hinds Myler hubs SSTG-1 STG-1 STAG-1 MHUB-1</p> <p>O-Z / Gedrey hub CHMG-50DT</p> <p>REMKE hub WH-1-G</p> <p>Killark Glands CMCXAA050 MCR050 MCX050</p>

9. In addition to the supplied bonding plate, when 2 or 3 metallic glands or conduit hubs are fitted to a BA484D Fieldbus Display, all metallic glands or conduit hubs must be connected together and grounded.

10. **CAUTION:** The BA484D and BA488C Serial Text Display enclosures are manufactured from conductive plastic per Article 250 of the National Electrical Code the enclosures shall be grounded using the 'E' terminal on the terminal block.

11. Up to two BA484D and/or BA488C Serial Text Displays may be connected to one system.

12. Up to four BA484D and/or BA488C Serial Text Displays may be connected to one system.

Iss.	Date	Modification	Ckd.	Appd.
1	01/03 2006	First release	.	.
2	01/08	CFM requirements added.	.	

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Title FM Approvals Control Drawing for Nonincendive BA484D & BA488C Serial Text Displays	Drawn RC	Checked	Scale NTS
Drawing No. Sheet 5		CI480-08	