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Member of the FM Global Group

CERTIFICATE OF COMPLIANCE

HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment:

BA474Da Indicating Temperature Transmitter

IS / I, II, III / 1 / ABCDEFG / T4 Ta = 70°C – CI470-12; Entity; Type 4X, IP66
 I / 0 / AEx ia / IIC / T4 Ta = 70°C – CI470-12; Entity; Type 4X, IP66
 NI / I, II, III / 2 / ABCDEFG / T4 Ta = 60°C – CI470-13; NIFW; Type 4X, IP66
 I / 2 / IIC / T4 Ta = 60°C – CI470-13; NIFW; Type 4X, IP66
 AIS / I, II, III / ABCDEFG - CI470-12; Entity; Type 4X, IP66
 [I / 0] / [AEx ia] IIC - CI470-12; Entity; Type 4X, IP66

**Intrinsic Safety Parameters
 Input Parameters**

Terminals	V _{max} (V)	I _{max} (mA)	P _i (W)	C _i (uF)	L _i (mH)
TB 2: 5 & 6	28	200	0.85	0.046	0.01
TB 3 (BA474D) or TB 601 (BA478C): 8 & 9: 11 & 12	30	200	0.85	0.02	0.01
TB1: 1, 2, 3 & 4	6	100	0.194	16.16	0

Output Parameters

Terminals	V _{oc}	I _{sc}	P _o	C _o	L _o
TB 3 (BA474D) or TB 601 (BA478C): 8 & 9: 11 & 12	0.7V	1.3uA	4uW	46nF	0.69mH
TB1: 1, 2, 3 & 4	6V	30.3mA	46mW	23.84uF	3mH



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Nonincendive Field Wiring Parameters

Input Parameters

Terminals	V _{max} (V)	I _{max} (mA)	P _i (mW)	C _i (uF)	L _i (mH)
TB 1: 1, 2, 3 & 4	6	100	194	16.16	0
TB 2; 5 & 6	28	200		0.046	0.01
TB 3: 8 & 9; 10 & 11	32	200		0.02	0.01

Output Parameters

Terminals	V _{oc} (V)	I _{sc} (mA)	P _o (mW)	C _o (uF)	L _o (mH)
TB 1: 1, 2, 3 & 4	6	30.3	46	23.84	3

a = Parameter not affecting safety.

Maximum r.m.s. a.c. or d.c. voltage (For AIS/[AEx ia] application)

Terminals TB 2: 5 & 6; TB 3: 8 & 9; 10 & 11

U_m = 250 V

Special conditions of use

1. The BA474D shall be protected from direct exposure to sunlight.

BA478Ca Indicating Temperature Transmitter

IS / I / I / ABCD / T4 Ta = 70°C – CI470-12; Entity; Type 4X, IP66

I / 0 / AEx ia / IIC / T4 Ta = 70°C – CI470-12; Entity; Type 4X, IP66

NI / I / 2 / ABCD / T4 Ta = 60°C – CI470-13; NIFW; Type 4X, IP66

I / 2 / IIC / T4 Ta = 60°C – CI470-13; NIFW; Type 4X, IP66

Intrinsic Safety Parameters

Input Parameters

Terminals	V _{max} (V)	I _{max} (mA)	P _i (W)	C _i (uF)	L _i (mH)
TB 2: 5 & 6	28	200	0.85	0.046	0.01
TB 3 (BA474D) or TB 601 (BA478C): 8 & 9; 11 & 12	30	200	0.85	0.02	0.01
TB1: 1, 2, 3 & 4	6	100	0.194	16.16	0

Output Parameters

Terminals	V _{oc}	I _{sc}	P _o	C _o	L _o
TB1: 1, 2, 3 & 4	6V	30.3mA	46mW	23.84uF	3mH

Nonincendive Field Wiring Parameters

Input Parameters

Terminals	V _{max} (V)	I _{max} (mA)	P _i (mW)	C _i (uF)	L _i (mH)
TB 1: 1, 2, 3 & 4	6	100	194	16.16	0
TB 2; 5 & 6	28	200		0.046	0.01
TB 3: 8 & 9; 10 & 11	32	200		0.02	0.01

a = Parameter not affecting safety.



Special conditions of use

1. To maintain the Type 4X and IP66 enclosure rating the BA478C shall be installed in accordance with the mounting conditions provided on drawing numbers CI470-12 and CI470-13.
2. The BA478C shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.
3. The BA478C shall be protected from direct exposure to sunlight.

Equipment Ratings:

BA474D Indicating Temperature Transmitter

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 when installed in accordance with the entity concept in accordance with Control Drawings CI470-12; Nonincendive for Class I, Division 2, Groups A, B, C and D and Class I, Zone 2, Group IIC, Hazardous (Classified) Locations when installed in accordance with the nonincendive field wiring concept in accordance with Control Drawings CI470-13; Suitable for Class II and III, Division 2, Groups E, F and G Hazardous (Classified) Locations when installed in accordance with the nonincendive field wiring concept in accordance with Control Drawings CI470-13. Temperature class T4 at an ambient of 60°C. Enclosure Type 4X and IP66.

Associated intrinsically safe apparatus for connection to 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 when installed in accordance with the entity concept in accordance with Control Drawings CI470-12. Enclosure Type 4X and IP66.

BA478C Indicating Temperature Transmitter

Intrinsically safe for Class I, Division 1, Groups A, B, C and D and Class I, Zone 0, Group IIC Hazardous (Classified) Locations when installed in accordance with the entity concept in accordance with Control Drawings CI470-13; Nonincendive for Class I, Division 2, Groups A, B, C and D and Class I, Zone 2, Group IIC, Hazardous (Classified) Locations when installed in accordance with the nonincendive field wiring concept in accordance with Control Drawings CI480-13. Temperature class T4 at an ambient of 60°C. Front panel Type 4X and IP66.

FM Approved for:

BEKA associates Ltd
Hitchin, Hertfordshire, SG5 2DD. 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
ANSI/IEC 60529	2004

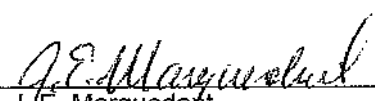
Original Project ID: 3035396

Approval Granted: *August 16, 2010*

Subsequent Revision Reports / Date Approval Amended

Report Number	Date	Report Number	Date
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FM Approvals LLC



J.E. Marquardt
Group Manager, Electrical

16 August 2010

Date

Appd.	
Ckd.	
Modification	
Date	
Iss.	
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Appd.	
Ckd.	
Modification	
Date	02.10 2008
Iss.	1
New drawing	

HAZARDOUS (CLASSIFIED) LOCATION

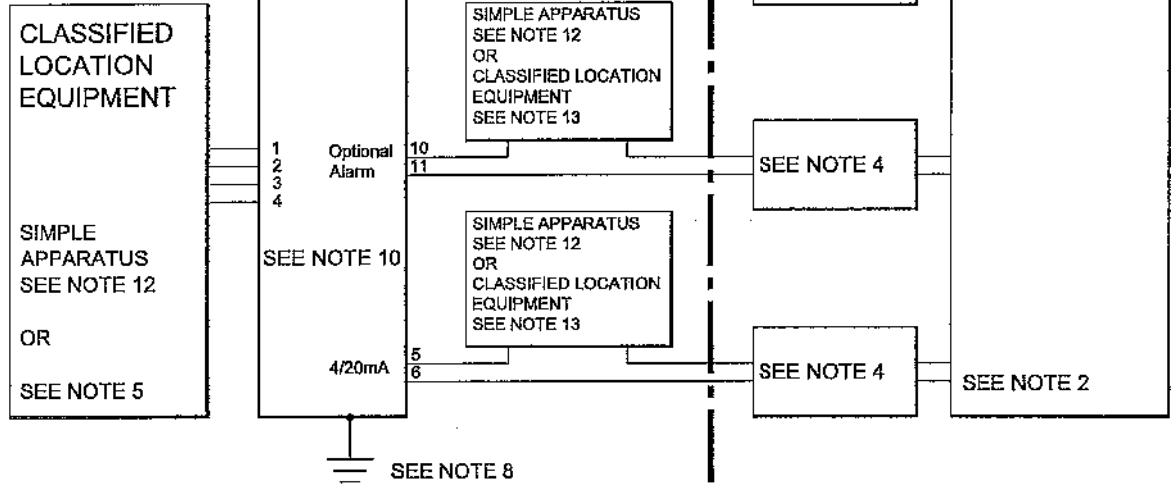
UNCLASSIFIED LOCATION

BA474D 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

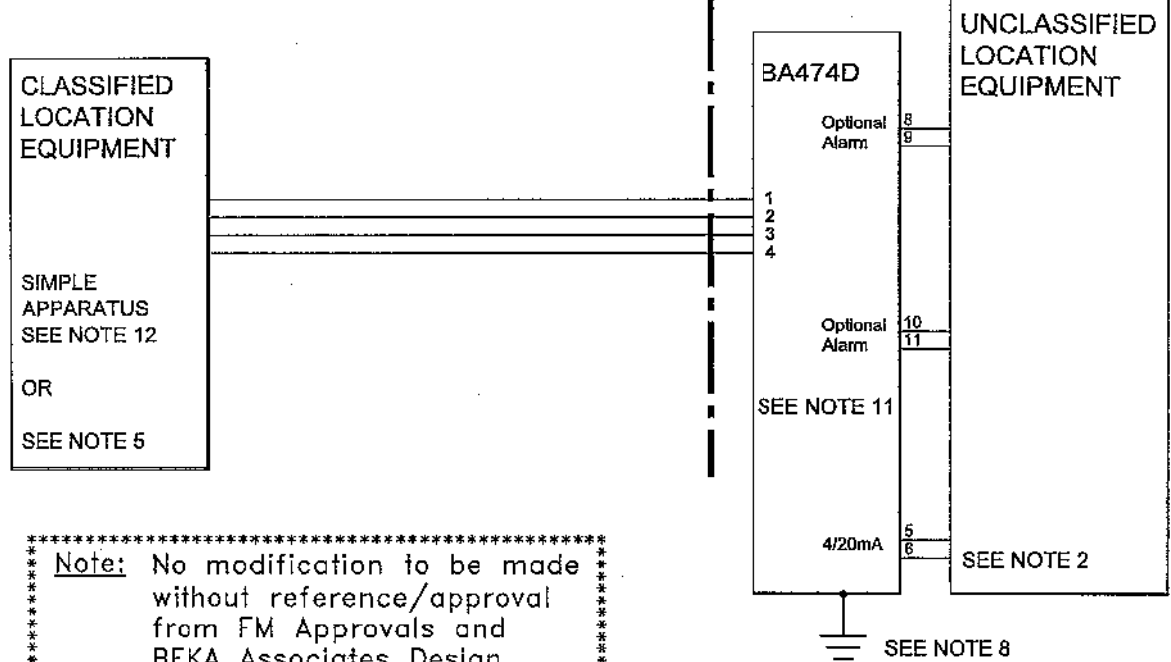
SEE
 NOTES 1 & 3

BA478C LOCATIONS:
 Class I, Division 1, Groups A, B, C & D
 Class I, Zone 0, Group IIC

BA474D & BA478C




BA474D



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

Title		Drawn	Checked	Scale
FM Approvals Control Drawing for Intrinsically Safe BA474D & BA478C Indicating Temperature Transmitters		RC	<i>[Signature]</i>	N/A
		Drawing No. CI470-12		
		Sheet 1 of 4		

Iss.	Date	Modification	Ckd.	Appd.
1	02.10.2008	New drawing		
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Iss.	Date	Modification	Ckd.	Appd.

Notes


- The associated protective barriers and galvanic isolators shall be FM approved and the manufacturers' installation drawings shall be followed when installing this equipment. For installations in Canada the associated protective barriers and galvanic isolators shall be cFM or CSA approved and the manufacturers' installation drawings shall be followed when installing the equipment.
- The unclassified location equipment shall not use or generate more than 250V rms or 250V dc.
- Installations 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.
- One single channel or one two channel associated protective barrier or galvanic isolator with entity parameters complying with the following requirements:

U_o or V_t	equal or less than	The lowest U_i of the FM, cFM or CSA approved apparatus installed in the loop.
I_o or I_t	equal to or less than	The lowest I_i of the FM, cFM or CSA approved apparatus installed in the loop.
P_o	equal to or less than	The lowest P_i of the FM, cFM or CSA approved apparatus installed in the loop.
L_o	equal to or greater than	The sum of the cable inductances and the internal inductances L_i of each FM, cFM or CSA approved apparatus in the loop.
C_o	equal to or greater than	The sum of the cable capacitance and the internal capacitance L_i of each FM, cFM or CSA approved apparatus in the loop.

- Simple apparatus or

U_o or V_t	equal or less than	U_i
I_o or I_t	equal to or less than	I_i
P_o	equal to or less than	P_i
$L_i + L_{cable}$	equal to or less than	L_o
$C_i + C_{cable}$	equal to or less than	C_o

Cont.

Iss.	Date	Title	Drawn	Checked	Scale
			RC		N/A
		FM Approvals Control Drawing for Intrinsically Safe BA474D & BA478C Indicating Temperature Transmitters	Drawing No. CI470-12		
			Sheet 2 of 4		

Iss.	Date	Modification	Ckd.	Appd.
1	02.10 2008	New drawing		

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6. When installed in a hazardous (classified) location the BA474D Indicating Temperature Transmitter shall be fitted with cable glands / conduit hubs selected from the following table
- Metallic glands and hubs must be grounded – see note 7.

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>

7. In addition to the supplied bonding plate, when 2 or 3 metallic glands or conduit hubs are fitted to a BA474D Indicating Temperature Transmitter, all metallic glands or conduit hubs shall be connected together and grounded.
8. **CAUTION** The BA474D and BA478C Indicating Temperature Transmitter enclosures are manufactured from conducting plastic per Article 250 of the National Electrical Code, the enclosures shall be grounded using the 'E' terminal on the terminal block.
9. The BA474D and BA478C Indicating Temperature Transmitters shall be mounted where they are shielded from direct sunlight.

10. **Terminals 1, 2, 3 and 4**

- Ui = 6V
- Ii = 100mA
- Pi = 194mW
- Uo = 6V
- Io = 30.3mA
- Po = 46mW
- Ci = 16.16µF
- Li = 0
- Co = 23.84µF
- Lo = 3mH

Terminals 5 and 6

- Ui = 28V
- Ii = 200mA
- Pi = 0.85W
- Ci = 46.42nF
- Li = 0.01mH
- Co = 36.58nF
- Lo = 0.69mH

Terminals 8, 9, 10 and 11

- Ui = 30V
- Ii = 200mA
- Pi = 0.85W
- Uo = 0.7V
- Io = 1.3µA
- Po = 4.0µW
- Ci = 20nF
- Li = 0.01mH
- Co = 46nF
- Lo = 0.69mH

Iss.	Date	Title	Drawn	Checked	Scale
			RC		N/A
			Drawing No. CI470-12		
			Sheet 3 of 4		

Iss.	Date	Modification	Ckd.	Appd.
1	03.10 2008	New drawing		

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HAZARDOUS (CLASSIFIED) LOCATION

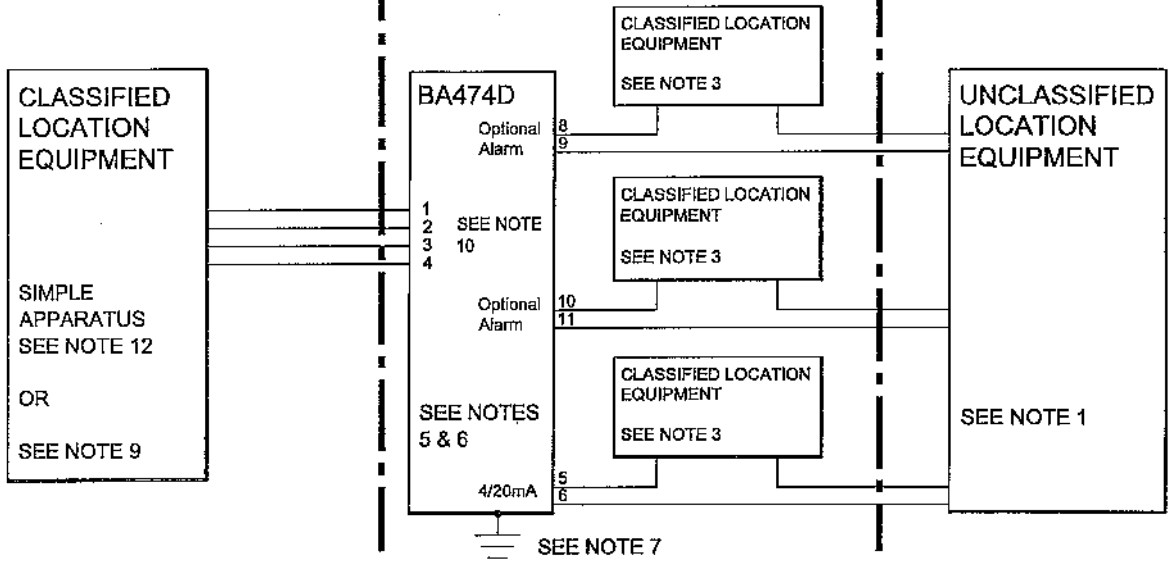
UNCLASSIFIED LOCATION

BA474D LOCATIONS:

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

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

SEE NOTE 2



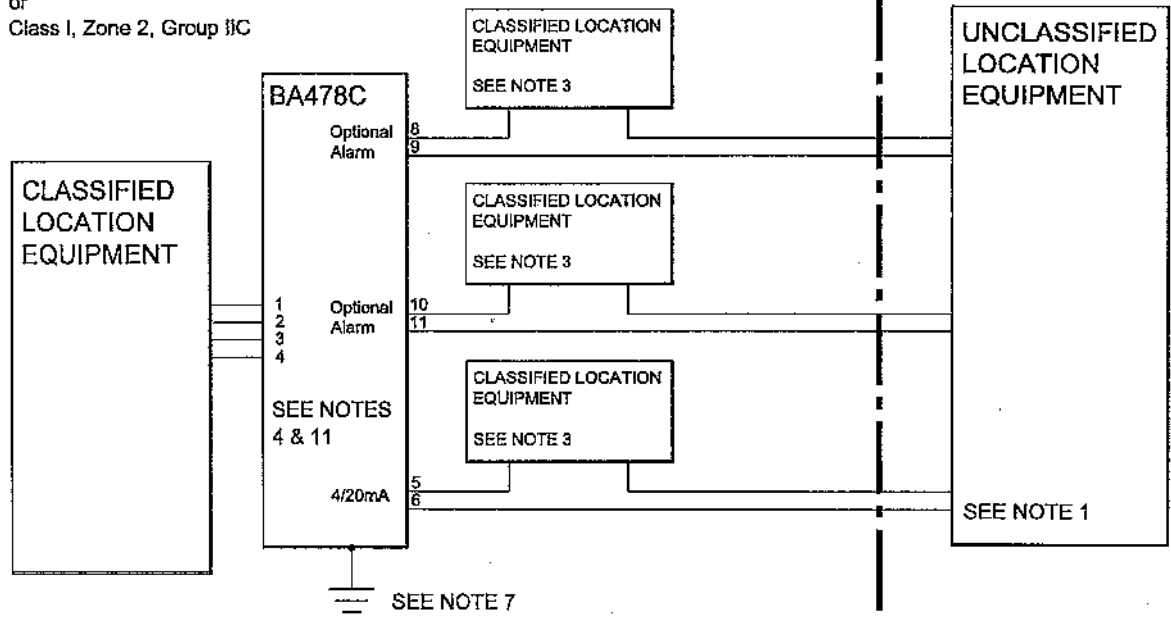
HAZARDOUS (CLASSIFIED) LOCATION

UNCLASSIFIED LOCATION

BA478C LOCATIONS:

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

SEE NOTE 2



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

Title		Drawn	Checked	Scale
FM Approvals Control Drawing for Nonincendive BA474D & BA478C Indicating Temperature Transmitters		RC	<i>[Signature]</i>	N/A
		Drawing No. CI470-13		
		Sheet 1 of 3		

Iss.	Date	Modification	Ckd.	Appd.
1	03.10.2008	New drawing		

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Notes

- The unclassified location equipment shall not use or generate more than 250V rms or 250V dc.
 - 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.
 - Classified location equipment shall be FM Approved Nonincendive Field Wiring Apparatus or simple apparatus as defined ANSI/NFPA 70. For Canadian installations classified location equipment shall be cFM or CSA Approved Nonincendive Field Wiring Apparatus.
 - To maintain IP66 protection between the BA474C Indicating Temperature Transmitter and the mounting panel:
 - Four panel mounting clips shall be used
 - Minimum panel thickness should be
 - 2mm (0.08inches) Steel
 - 3mm (0.12inches) Aluminium
 - Outside panel finish shall be smooth, free from particle inclusions, runs or build-up around cut-out.
 - Panel cut-out shall 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 shall be deburred and clean
 - Each panel mounting clip shall be tightened to between:
 - 20 and 22cNm (1.77 to 1.95 inLb)
 - When installed in a hazardous (classified) location the BA474D Indicating Temperature Transmitter shall be fitted with cable glands / conduit hubs selected from the following table
- Metallic glands and hubs must be grounded – see note 6.

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>

Iss.	Date	Title	Drawn	Checked	Scale
			RC		N/A
		FM Approvals Control Drawing for Nonincendive BA474D & BA478C Indicating Temperature Transmitters	Drawing No.	CI470-13	
			Sheet 2 of 3		

