

British Approvals Service for Electrical Equipment in Flammable Atmospheres

1. **CERTIFICATE OF CONFORMITY**

2. BAS No Ex 832399 dated 27 January 1984
3. This certificate is issued for the electrical apparatus:
A BA303B 4/20mA DIGITAL METER
4. manufactured and submitted for certification by:
BEKA ASSOCIATES
of Hitchin, Herts
5. This electrical apparatus and any acceptable variation thereto is specified in the Schedule to this Certificate and the documents therein referred to.
6. BASEEFA being an Approved Certification Body in accordance with Article 14 of the Council Directive of the European Communities of 18 December 1975 (76/117/EEC) confirms that the apparatus has been found to comply with harmonised European Standards.

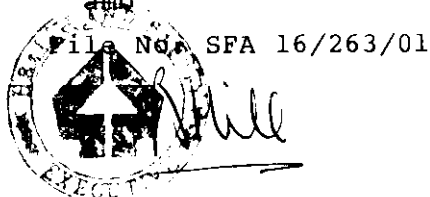
BS 5501:Part 1:1977 EN50 014
BS 5501:Part 7:1977 EN50 020

and has successfully met the examination and test requirements which are recorded in confidential Test Report

ERA Ref 3627/066, Rev 1 dated January 1984
(Held on File No SFA 12/716/01)

7. The apparatus marking shall include the code

EEx ia IIC T4 ($T_{amb} = 60^{\circ}\text{C}$)



B HILL
DIRECTOR

Sheet 1/3

Certificate BAS No Ex 832399 dated 27 January 1984

8. The supplier of the electrical apparatus referred to in this certificate has the responsibility to ensure that the apparatus conforms to the specification laid down in the Schedule to this certificate and has satisfied routine verifications and tests specified therein.
9. This apparatus may be marked with the Distinctive Community Mark specified in Annex II to the Council Directive of 6 February 1979 (Doc 79/196/EEC). A facsimile of this mark is printed on sheet 1 of this certificate.

Sheet 2/3

This certificate is granted subject to conditions applicable to the Approval Service, it does not necessarily indicate that the apparatus may lawfully be used in particular industries or circumstances.

CERTIFICATE OF CONFORMITY



SCHEDULE

NUMBER Ex 832399

DATED

27 January 1984

APPARATUS

A BA303B 4/20mA DIGITAL METER is designed to display the current in a 4/20mA signal loop.

The circuit is arranged on five printed circuit boards in an aluminium alloy enclosure which provides a Degree of Protection of at least IP20.

Intrinsic safety is assured by limitation of capacitance, suppression of inductance by shunt components, internal voltage limitation, and limitation of input current and power.

The apparatus must be connected to an intrinsically safe circuit whose output parameters do not exceed the following :-

$I_{\text{max:out}} = 215\text{mA d.c.}$

$W_{\text{max:out}} = 1.1\text{W}$

The equivalent resistance of the apparatus terminals is 15.4 ohm minimum in normal operation and 24 ohm maximum under fault conditions. The internal segregation of the meter satisfies the requirements for a peak voltage of 60V.

The equivalent output parameters of the apparatus are :-

$U_{\text{max:out}} = 1.2\text{V}$

$I_{\text{max:out}} = 75\text{mA}$

$W_{\text{max:out}} = 20\text{mW}$

$C_{\text{eq}} = 0.015\mu\text{F}$

$L_{\text{eq}} = 2\mu\text{H}$

For intrinsic safety considerations the output parameters at the apparatus terminals do not exceed those specified in Clause 1.3 of BS 5501 : Part 1 : 1977, EN50 014. The equivalent capacitance and inductance are the result of r.f. suppression components directly connected to the apparatus terminals.

DRAWING

Number	Issue	Date	Description
CI303-001 Sheets 1-9 & 11-16	2	Oct 1983	Certification information

British Approvals Service for Electrical Equipment in Flammable Atmospheres

CERTIFICATE OF CONFORMITY VARIATION

THIS IS TO CERTIFY THAT CERTIFICATE OF CONFORMITY BAS NO Ex 832399

Issued to **BEKA ASSOCIATES**
of Hitchin, Herts

for the **BA 303B 4/20mA DIGITAL METER**

is hereby extended to apply to apparatus designed and constructed in accordance with the specification set out in the Schedule of the said Certificate but having the variation specified in the following Schedule.

Schedule

VARIATION ONE To permit relocation of the R.F. suppression components, D201, C201, L201 and L202 on to the opposite side of the printed circuit board PC2.

DRAWINGS

<u>Number</u>	<u>Issue</u>	<u>Date</u>	<u>Description</u>
CI 303-001			
Sheets 2,8,9 & 16	3	March 84	Certification information

Code: EEx ia IIC T4
(T_{amb} = 60°C)

File: SFA 16/263/01



CERTIFICATE OF CONFORMITY BAS NO Ex 832399/1

61/11

B HILL
DIRECTOR
Dated 13 April 1984



British Approvals Service for Electrical Equipment in Flammable Atmospheres

CERTIFICATE OF CONFORMITY ^{VARIATION}

THIS IS TO CERTIFY THAT

CERTIFICATE OF CONFORMITY BAS NO Ex 832399

Issued to BEKA ASSOCIATES
of Hitchin, Herts

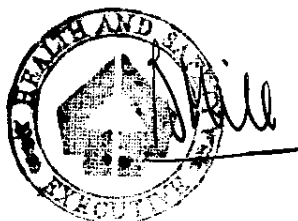
for the BA 303B 4/20mA DIGITAL METER

is hereby extended to apply to apparatus designed and constructed in accordance with the specification set out in the Schedule of the said Certificate but having the variations specified in the attached Schedule.

Code : EEx ia IIC T4
(Tamb = 60°C)

File : SFA 16/263/01

CERTIFICATE OF CONFORMITY BAS NO Ex 832399/2



B HILL
DIRECTOR
Dated 22 April 1985
Sheet 1/2

CERTIFICATE OF CONFORMITY



SCHEDULE

NUMBER Ex 832399/2

DATED 22 April 1985

VARIATION TWO

To permit the following changes to form a BA 307B 4/20mA Digital Meter.

- (1) Re-arrangement of the electronic components onto two printed circuit boards which are mounted in a plastics enclosure.

The enclosure may be panel mounted.

- (2) The addition of four resistors R125, R126, R127 and R128 and the removal of diode D201.

The intrinsic safety parameters are not affected by these changes.

DRAWING

Number	Issue	Date	Description
CI 307-001 Sheets 1-12	2	March 85	Certification Information

British Approvals Service for Electrical Equipment in Flammable Atmospheres

VARIATION

CERTIFICATE OF CONFORMITY

THIS IS TO CERTIFY THAT

CERTIFICATE OF CONFORMITY BAS NO Ex 832399

Issued to BEKA ASSOCIATES
of Hitchin, Herts

for the BA 303B 4/20mA DIGITAL METER

is hereby extended to apply to apparatus designed and constructed in accordance with the specification set out in the Schedule of the said Certificate but having the variations specified in the following Schedule.

VARIATION THREE

To permit the use of a larger display module housed in a larger meter enclosure to form a BA 308B 4/20mA DIGITAL METER.

DRAWINGS

Number	Issue	Date	Description
CI308-001			
Sheets 1-12	-	June 85	Certification Information

Code : EEx ia IIC T4
(Tamb = 60°C)

File : SFA 16/263/01



CERTIFICATE OF CONFORMITY BAS NO Ex 832399/3

B HILL
DIRECTOR

Sheet 1/1

344

Dated 11 September 1985



Health &
Safety
Executive



BASEEFA

British Approvals Service for Electrical Equipment in Flammable Atmospheres

VARIATION

CERTIFICATE OF CONFORMITY

THIS IS TO CERTIFY THAT

CERTIFICATE OF CONFORMITY BAS NO Ex 832399

Issued to BEKA ASSOCIATES
of Hitchin, Herts

for the BA 303B 4/20mA DIGITAL METER

is hereby extended to apply to apparatus designed and constructed in accordance with the specification set out in the Schedule of the said Certificate but having the variations specified in the attached Schedule.

Code : EEx ia IIC T4

File : SFA 16/263/01



CERTIFICATE OF CONFORMITY BAS NO Ex 832399

Sheet 1/2
430/4

B HILL
DIRECTOR
Dated 15 May 1986

CERTIFICATE OF CONFORMITY



SCHEDULE

NUMBER Ex 832399/4

DATED 15 May 1986

VARIATION FOUR

To permit the following changes to form a BA 304B 4/20mA DIGITAL METER.

1. Re-arrangement of the electronic components onto two printed circuit boards which are mounted in an aluminium enclosure or optionally in a plastics enclosure.
2. The addition of diode D201.

The intrinsic safety parameters are not affected by these changes.

DRAWINGS

Number	Issue	Date	Description
CI304-001 Sheets 1-14	1	Dec 85	Certification Information

British Approvals Service for Electrical Equipment in Flammable Atmospheres

CERTIFICATE OF CONFORMITY

VARIATION

THIS IS TO CERTIFY THAT

CERTIFICATE OF CONFORMITY BAS NO Ex 832399

Issued to BEKA ASSOCIATES
of Hitchin, Herts

for the BA 303B 4/20mA DIGITAL METER

is hereby extended to apply to apparatus designed and constructed in accordance with the specification set out in the Schedule of the said Certificate but having the variations specified in the following Schedule.

VARIATION FIVE

To permit substitution of the manufacturer's name on the front panel of the BA 307B 4/20mA DIGITAL METER with that of Pepperl & Fuchs as a Trade Agent. The detail on the main certification label is unchanged.

DRAWING

Number	Issue	Date	Description
CI307-002	-	May 86	Alternative Front Panel

Code : EEx ia IIC T4
(Tamb = 60°C)

File : SFA 16/263/01

CERTIFICATE OF CONFORMITY BAS NO Ex 832399



Sheet 1/1
469/5

DIRECTOR

Dated 11 July 1986

BASEEFA Harpur Hill Buxton Derbyshire SK17 9JN Tel 0298 6211 Telex 668113 RLSD G



BASEEFA

British Approvals Service
for
Electrical Equipment
in
Flammable Atmospheres

THIS IS TO CERTIFY THAT A BA303B 4/20mA DIGITAL METER

covered by BASEEFA Certificate Number Ex 832399

Issued to **BEKA ASSOCIATES**
of Hitchin, Herts

may be marketed in the name of

PEPPERL + FUCHS AG
of Mannheim, West Germany

and being regarded as covered by the said Certificate, subject to the following conditions:-

- 1) The manufacturer shall substitute the name or registered trade-mark of the Trade Agent for that of his own name or registered trade-mark on the label affixed to the apparatus to be marketed by the Trade Agent, and shall also include the letter 'A', enclosed in a circle, to indicate that the Trade Agent has been registered with the Service.
- 2) The Trade Agent shall not make any change or modification to the apparatus or label affixed by the manufacturer.

LABEL DRAWING NO: CI 307-002 Issue - Dated May '86

TRADE AGENT REGISTRATION NO : SFA 16/263/01/T/01



DIRECTOR
3 July 1986



British Approvals Service for Electrical
Equipment in Flammable Atmospheres

CERTIFICATE OF CONFORMITY VARIATION

THIS IS TO CERTIFY THAT CERTIFICATE BAS No. Ex 832399

Held by BEKA ASSOCIATES LIMITED

of Hitchin, SG5 2DD

for the BA303B 4/20mA DIGITAL METER

is hereby extended to apply to apparatus designed and constructed in accordance with the specification set out in the Schedule of the said Certificate but having the variation specified in the attached Schedule.

A copy of this Supplementary Certificate shall be attached to the original certificate.

Code: see schedule

File No: EECS 0121/02/003

ERA Report: 3627/578 dated June 1992



CERTIFICATE BAS No Ex 832399/6

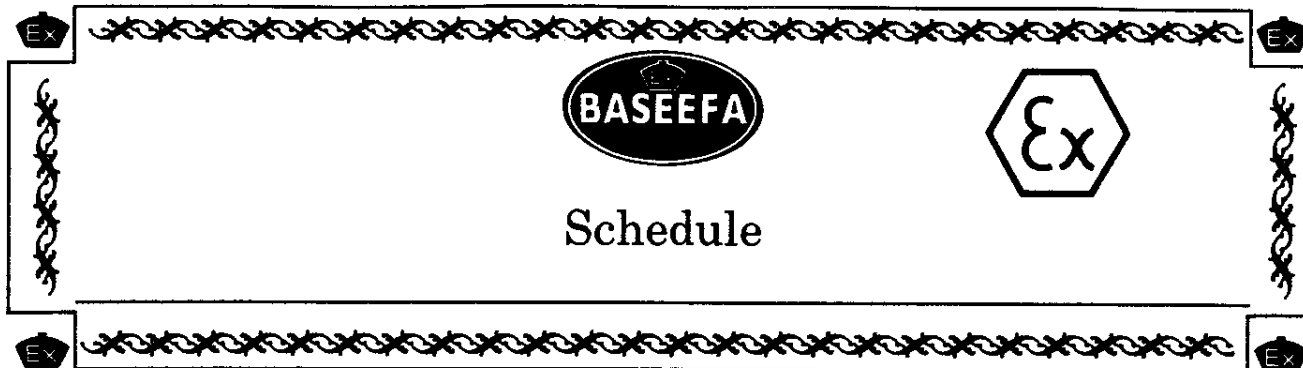
Sheet 1/3
3786/52

I M CLEARE
DIRECTOR EECS
30 June 1992



Electrical Equipment Certification Service
Health and Safety Executive
Harpur Hill, Buxton, Derbyshire, SK17 9JN, United Kingdom
Tel: 0298 262111 Fax: 0298 79514 Telex: 668113 RLSD G





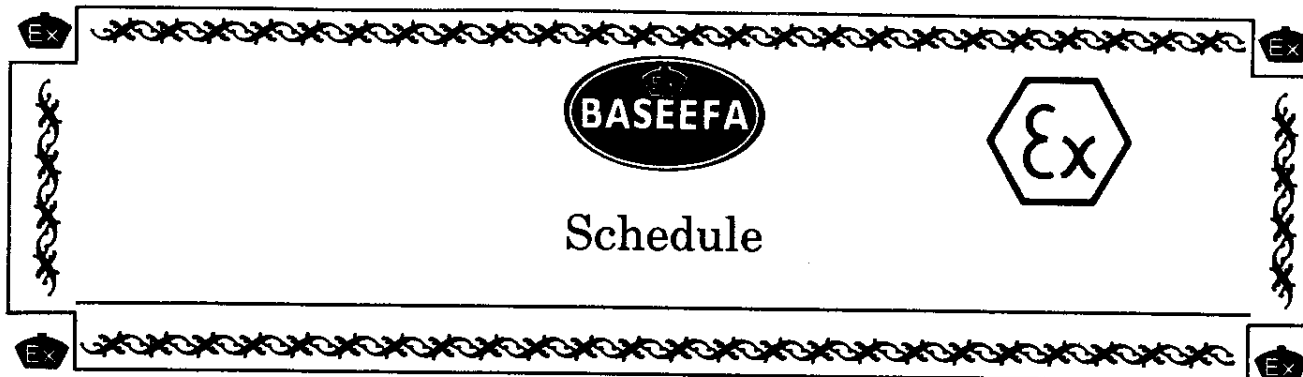
Certificate of Conformity BAS No Ex 832399/6 dated 30 June 1992

VARIATION SIX

To permit the following changes to form a BA327B 4/20mA DIGITAL METER

- i) Modification to the electrical circuit to incorporate a microcontroller, an EEPROM and calibration circuit.
- ii) Re-numbering some of the safety components.
- iii) Values of capacitors C5 (was C3), C6 (was C4) each $1 \mu\text{F} \pm 20\%$ and C1, $22 \mu\text{F} -10\% + 50\%$ changed to $47 \mu\text{F} - 20\% + 50\%$,
- iv) Addition of R5 and R6, each $15 \Omega \pm 1\%$ fitted in series with C5 and C6 respectively.
- v) Addition of suppression capacitors.
- vi) Change of maximum input parameters from $I_{\text{max:in}} = 215\text{mA d.c.}$ and $W_{\text{max:in}} = 1.1\text{W}$ to $I_{\text{max:in}} = 200\text{mA d.c.}$ and $W_{\text{max:in}} = 0.85\text{W}$.
The revised apparatus coding is EEx ia IIC T5 ($T_{\text{amb}} = 60^\circ\text{C}$).
- vii) Modifications to the printed circuit board layouts.
- viii) The electronic components re-arranged on to five printed circuit boards and housed within a plastics enclosure.
- ix) Change of terminals for external use from Klippon Type GSE5 to Klippon Type SL8-H and BL8.

The equivalent parameters are unchanged and the above changes do not affect the intrinsic safety of the unit.



Certificate of Conformity BAS No Ex 832399/6 dated 30 June 1992

DRAWINGS

Number	Issue	Date	Description
CI327-01			
Sheets 1 to 18	2	April 92	Certification Information

VARIATION SEVEN

To permit the printed circuit boards containing electronic components to be housed within a larger plastics enclosure with a larger display module this forming a BA328B 4/20mA DIGITAL METER.

DRAWINGS

Number	Issue	Date	Description
CI328-01			
Sheets 1 to 18	1	April 92	Certification Information

VARIATION EIGHT

To permit the electronic components to be re-arranged on to four printed circuit boards and housed within an aluminium alloy enclosure or a plastics enclosure thus forming a BA324B 4/20mA DIGITAL METER.

DRAWINGS

Number	Issue	Date	Description
CI324-01			
Sheets 1 to 18	1	April 92	Certification Information



British Approvals Service for Electrical
Equipment in Flammable Atmospheres



CERTIFICATE OF CONFORMITY VARIATION

THIS IS TO CERTIFY THAT CERTIFICATE BAS No. Ex 832399

Held by BEKA ASSOCIATES LIMITED

of Hitchin, SG5 2DD

for the BA303B 4/20mA DIGITAL METER

is hereby extended to apply to apparatus designed and constructed in accordance with the specification set out in the Schedule of the said Certificate but having the variation specified in the attached Schedule.

A copy of this Supplementary Certificate shall be attached to the original certificate.

File No: EECS 0121/02/003

ERA Ref: 3627/639



CERTIFICATE BAS No Ex 832399/7

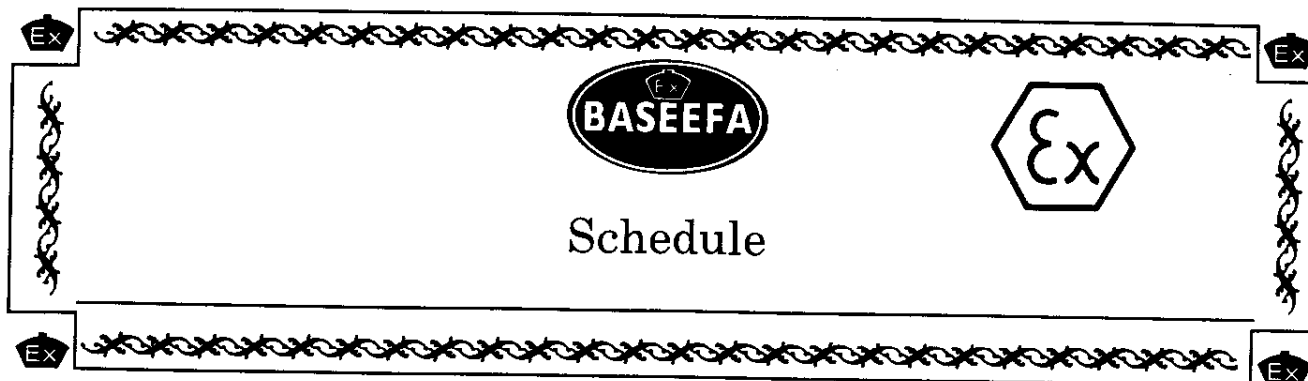
Sheet 1/3
3786/52

I M CLEARE
DIRECTOR EECS
29 January 1993



Electrical Equipment Certification Service
Health and Safety Executive
Harpur Hill, Buxton, Derbyshire, SK17 9JN, United Kingdom
Tel: 0298 262111 Fax: 0298 795114 Telex: 668113 RLSD G





Certificate of Conformity BAS No Ex 832399/7 dated 29 January 1993

VARIATION NINE

To permit the following changes to the BA327B and BA328B 4/20 mA Digital Meter.

- 1 Increase in the area of the solder pads on PC26 which are used to connect the transformer T1 to the printed circuit board.
- 2 Reduction of length of printed circuit boards PC27 and PC28 and minor modifications to the track layouts.

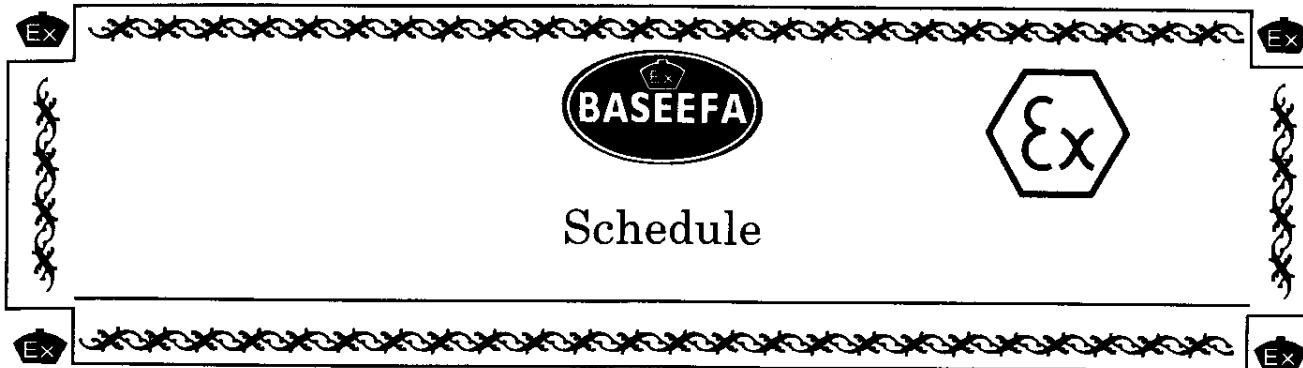
DRAWINGS

Number	Issue	Date	Description
CI327-01 Sheets 2, 11 to 13	3	Oct 92	Certification Information for BA 327B
CI328-01 Shts 2, 11 to 13	2	Oct 92	Certification Information for BA328B

VARIATION TEN

To permit the following changes to the BA324B 4/20 mA Digital Meter.

- 1 Fitting of an optional neoprene pushbutton to the front cover so that the switch on PC36 can be activated with the cover in place. Degree of Protection IP20 is maintained.
- 2 Increase in the area of the solder pads on PC26 which are used to connect the transformer T1 to the printed circuit board.



Certificate of Conformity BAS No Ex 832399/7 dated 29 January 1993

DRAWINGS

Number	Issue	Date	Description
CI324-01 Shts 2, 10 & 12	3	Oct 92	Certification Information for BA324B



British Approvals Service for Electrical
Equipment in Flammable Atmospheres

CERTIFICATE OF CONFORMITY VARIATION

THIS IS TO CERTIFY THAT CERTIFICATE BAS No Ex 832399

Held by **BEKA ASSOCIATES LIMITED**

of **Hitchin, SG5 2DY**

for the **BA303B 4/20mA DIGITAL METER**

is hereby extended to apply to apparatus designed and constructed in accordance with the specification set out in the Schedule of the said Certificate but having the variation specified in the attached Schedule.

A copy of this Supplementary Certificate shall be attached to the original certificate.

File No. EECS 0121/02/003

ERA Ref: 3627/718

CERTIFICATE BAS No Ex 832399/8

Sheet 1/4

C0241/VKV1

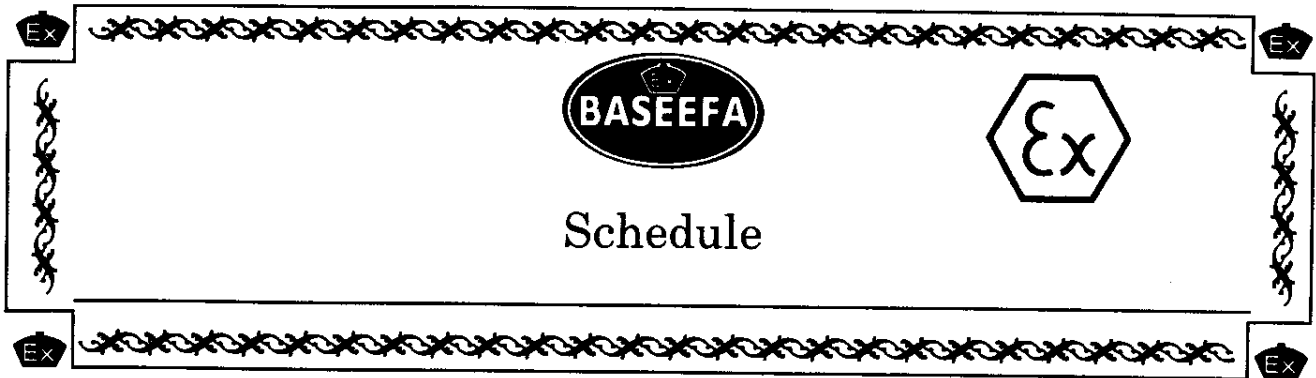


I M CLEARE
DIRECTOR EECS
17 May 1994



Electrical Equipment Certification Service
Health and Safety Executive
Harpur Hill, Buxton, Derbyshire, SK17 9JN, United Kingdom
Tel: 0298 262111 Fax: 0298 79514 Telex: 668113 RLSD G





Certificate of Conformity BAS No. Ex 832399/8 dated 17 May 1994

VARIATION ELEVEN

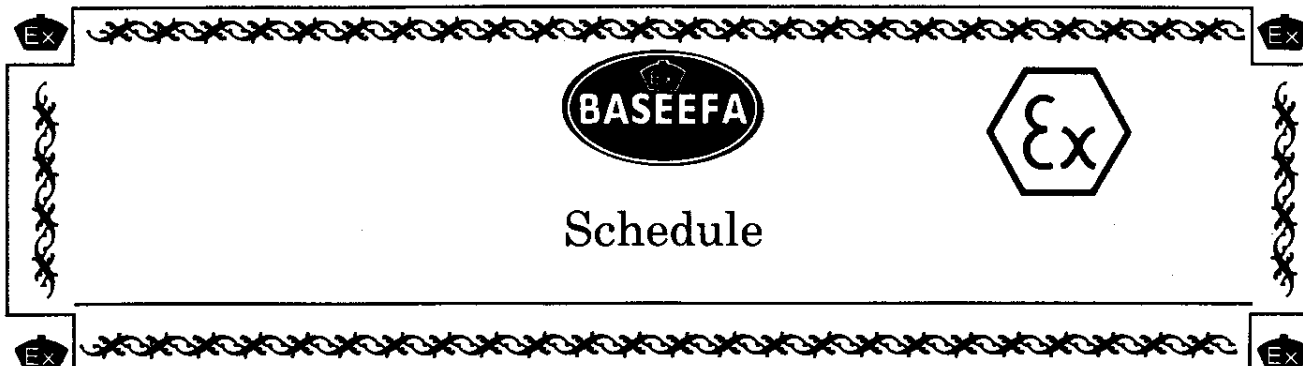
To permit the following changes to the BA304B 4/20mA Digital Meter

- i) Removal of the description of Transformer T1
- ii) Alternative window fixing brackets and/or use of adhesive
- iii) Addition of a note against C106 allowing smaller values of capacitance

These changes do not affect intrinsic safety and the equivalent parameters of the apparatus are unchanged.

DRAWINGS

Number	Issue	Date	Description
CI304-001 Shts 2, 3,4, 7	2	Feb 94	Certificate Information for BA304B



Certificate of Conformity BAS No. Ex 832399/8 dated 17 May 1994

VARIATION TWELVE

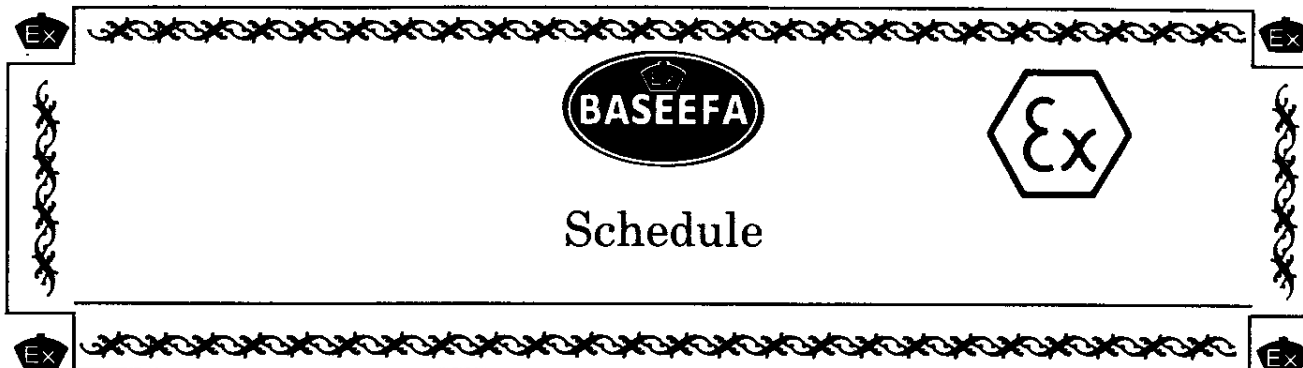
To permit the following changes to the BA307B and BA308B 4/20 mA Digital Meters.

- i) Removal of the description of transformer T1
- ii) Variation of outline of printed circuit boards, PC13 (BA307B) and PC14 (BA308B) without modifying the artwork.
- iii) Provision to fit optional non-conductive fixing blocks.
- iv) Alternative certification details silk-screened on rear panel
- v) Addition of notes relating to the label material, and gap between support and solder joints (BA308B)

DRAWINGS

Number	Issue	Date	Description
CI307-001 Sheets 2, 4, 6, 7, 8, 11	3	Feb 94	Certification Information for BA307B
CI308-001 Sheets 2, 4, 6, 7, 8, 11	2	Feb 94	Certification Information for BA308B

Sheet 3/4



Certificate of Conformity BAS No. Ex 832399/8 dated 17 May 1994

VARIATION THIRTEEN

To permit changes to the BA324B 4/20 mA Digital Meter of alternative window fixing brackets and/or use of adhesive.

DRAWINGS

Number	Issue	Date	Description
CI324-01 Sheets 2, 10	4	Feb 94	Certification Information for BA324B

VARIATION FOURTEEN

To permit the following changes to the BA327B and BA328B 4/20 mA Digital Meters.

- i) Provision to fit optional non-conductive fixing blocks
- ii) Alternative certification details silk-screened on rear panel
- iii) Addition of notes relating to the label material, and gap between supports and soldering joints (BA328B)

DRAWINGS

Number	Issue	Date	Description
CI327-01 Sheets 2, 10, 18	4	Feb 93	Certification Information for BA327B
CI328-01 Sheets 2, 10, 18	3	Feb 93	Certification Information for BA328B

Sheet 4/4



British Approvals Service for Electrical
Equipment in Flammable Atmospheres



Certificate of Conformity Variation

THIS IS TO CERTIFY THAT CERTIFICATE BAS No Ex 832399

Held by **BEKA ASSOCIATES**

of **Hitchin, Herts, SG5 2DA**

for the **BA303B 4/20 m/A DIGITAL METER**

is hereby extended to apply to apparatus designed and constructed in accordance with the specification set out in the Schedule of the said Certificate but having the variation specified in the attached Schedule.

A copy of this Supplementary Certificate shall be attached to the original certificate.

File No. EECS 0121/02/003
ERA Ref: 3627/730

Sheet 1/2

CERTIFICATE BAS No Ex 832399/9

VKV1/C0410B/27



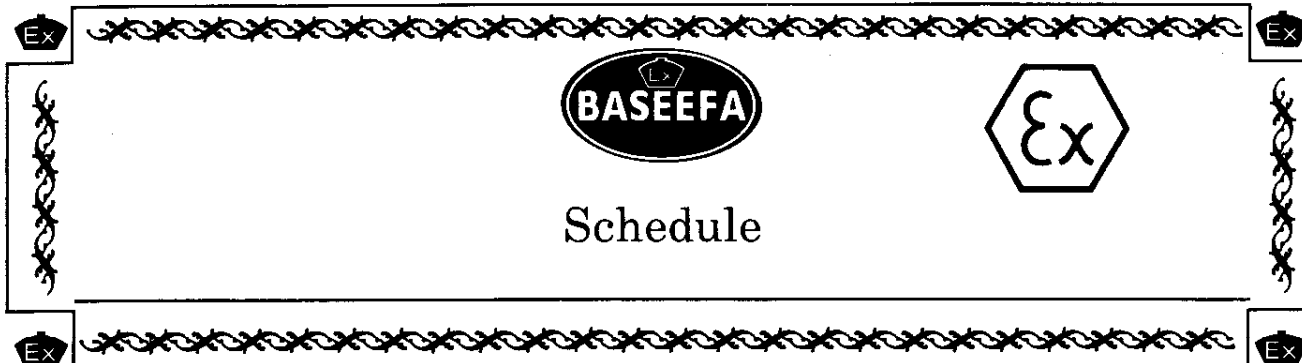
**PP IM CLEARE
DIRECTOR EECS
31 August 1994**

This certificate is issued under NACCB accreditation No. 020



Electrical Equipment Certification Service
Health and Safety Executive
Harpur Hill, Buxton, Derbyshire, SK17 9JN, United Kingdom
Tel: 0298 262111 Fax: 0298 79514 Telex: 668113 RLSD G





Certificate of Conformity BAS No Ex 832399/9 dated 31 August 1994

VARIATION FIFTEEN

To permit a lower ambient temperature of -45°C for the BA304B 4/20 mA Digital Meter, Certificate BAS No Ex 832399 Variations Four and Eleven and BA324B 4/20 mA Digital Meter, Certificate BAS No Ex 832399 Variations Eight and Thirteen.

The coding is unchanged, the ambient temperature range is extended to -45°C to +60°C.

DRAWINGS

Number	Issue	Date	Description
CI304-03	1	8.94	BA304B Certification Label
CI324-03	1	8.94	BA324B Certification Label



British Approvals Service for Electrical
Equipment in Flammable Atmospheres



Certificate of Conformity Variation

THIS IS TO CERTIFY THAT CERTIFICATE BAS NO Ex 832399

Held by **BEKA ASSOCIATES**
of Hitchin, Herts, SG5 2DA

for the **BA303B 4/20mA DIGITAL METER**

is hereby extended to apply to apparatus designed and constructed in accordance with the specification set out in the Schedule of the said Certificate but having the variations specified in the attached Schedule.

A copy of this Supplementary Certificate shall be attached to the original Certificate.

File No: EECS 0121/02/003



CERTIFICATE BAS NO Ex 832399/10
Sheet 1/2
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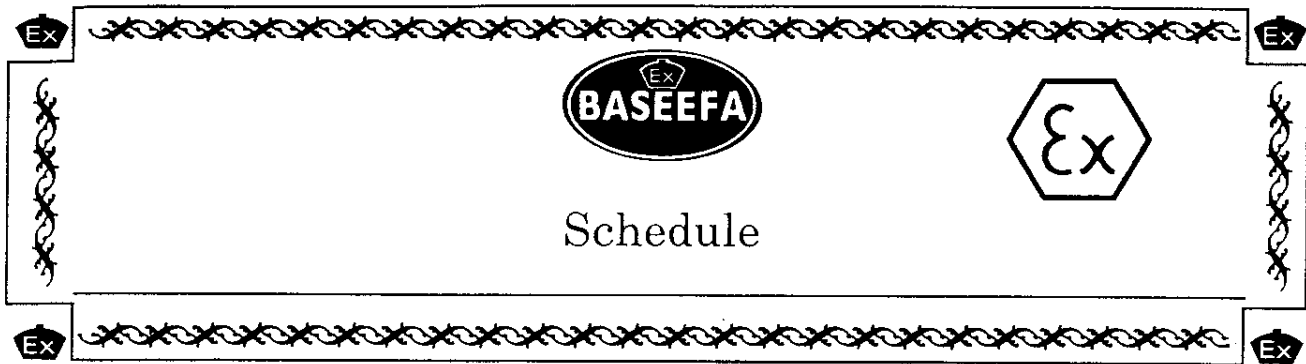
I M CLEARE
DIRECTOR EECS
31 August 1995

This certificate is issued under NACCB accreditation No. 020



Electrical Equipment Certification Service
Health and Safety Executive
Harpur Hill, Buxton, Derbyshire, SK17 9JN, United Kingdom
Tel: 0298 262111 Fax: 0298 79514 Telex: 668113 RLSD G





Certificate of Conformity BAS No Ex 832399/10

**VARIATION
SIXTEEN**

To permit the use of an alternative operational amplifier
in the BA324B, BA327B and BA328B 4/20mA Digital Meters.

DRAWINGS

Number	Issue	Date	Description
CI324-01 Sheets 2 and 8 of 18	5	Aug 95	Certification information
CI327-01 Sheets 2 and 8 of 18	5	Aug 95	Certification information
CI328-01 Sheets 2 and 8 of 18	4	Aug 95	Certification information