Display instrumentation for use in safe and hazardous areas

visit our website www.beka.co.uk
How to use this Catalogue

Each section of this catalogue is devoted to a single type of product and includes a summary to aid selection. Datasheets in each section are arranged in alphanumeric order and are colour coded to show the product safety certification:

- **Dark blue** Intrinsically safe
- **Magenta** Type nL for use in Zone 2 hazardous areas
- **Light blue** Flameproof
- **Green** General purpose - not certified

**BEKA Website**

The BEKA website at www.beka.co.uk is regularly updated to provide the latest product information and news. It enables datasheets, instruction manuals, safety certificates and application guides to be downloaded.

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Index of all model numbers Inside rear cover

All model numbers are listed in alphanumeric order on the inside of the rear cover, with a brief description and catalogue page number.

**News by e-mail**

If you would like to receive occasional updates from BEKA when new products, services or certifications become available, please send an e-mail to sales@beka.co.uk
Our experienced sales engineers will be pleased to guide you through the BEKA product range and to answer applicational questions. Led by Andy Clarke, the in-house team includes Darryl Jones, Zena Puckey and Lorna Hill. Our field sales engineers can provide product demonstrations at your site, or potential customers can take advantage of our long established instrument evaluation service which allows you to Try before you Buy.

The BEKA web site provides rapid access to product datasheets, instruction manuals, application guides and safety certificates, plus regular BEKA news updates. It also lists all our overseas agents with links to their web sites and e-mail addresses.

BEKA is predominantly an engineering company consistently investing in new product development. Our new fieldbus indicators and displays, which are announced in this catalogue, result from many man years of development in co-operation with customers and system providers. To support and demonstrate these products, we maintain some of the most popular fieldbus hosts within our design department.

Our ISO9001:2000 quality system, which is administrated by our QA Manager Mervyn Wilson, extends throughout the company from supplier evaluation to the despatch of finished products. We also have an in-house EMC laboratory and environmental testing facilities which enable us to verify the performance of our designs and products.

Steve Riley our Service Manager is responsible for the re-calibration, refurbishment and repair of returned BEKA products. All returned instruments are inspected on the day of receipt and they can normally be repaired and despatched within two working days. Please don’t forget that all BEKA manufactured products are fully guaranteed for three years.
Placing your order

**POST**
BEKA associates Ltd
Old Charlton Road, Hitchin,
Hertfordshire, UK  SG5 2DA

**TELEPHONE**
+44 (0) 1462 438301

**FAX**
+44 (0) 1462 453971

**e-mail**
sales@beka.co.uk

Please visit our website [www.beka.co.uk](http://www.beka.co.uk) or contact our sales office for further information about products.

**PRICES**
Prices for all our products are shown in our UK Price List which is available from our sales office.

**DESPATCH**
Orders for small quantities of instruments can normally be despatched within three working days, but if required earlier despatches can usually be arranged.

**TERMS & CONDITIONS**
Terms & Conditions of trading are available from our website or our sales office. Unless otherwise agreed in writing all accounts are net monthly. Payment is therefore due before the end of the month following the month in which the invoice was dated. Please ask your accounts department to pay on time so that we can continue to maintain low prices.

**ACCOUNTS**
To open a credit account please supply the name and address of your bank, your account number and two trade references with your first order. Alternatively, payment may be made via a Credit Card or we can issue a pro-forma invoice.

**OVERSEAS CUSTOMERS**
BEKA products are available from more than fifty overseas agents. The countries in which we are represented are shown on our website at [www.beka.co.uk](http://www.beka.co.uk) If we are not represented in your area, please contact us directly for an export quotation.

**EVALUATION SERVICE**
Our free evaluation service enables potential customers to prove the suitability of any BEKA product for up to three months. Please contact our sales department for details.

**HOW TO FIND US**
BEKA associates is located close to Hitchin town centre, adjacent to Hitchin Priory and historic Tilehouse Street. Parking for visitors is available. Hitchin railway station is less than one mile away.
Having already established a commanding presence in our domestic market, BEKA became a net exporter in 2005 and we now ship well over half of our manufactured output via an expanding network of export agents. Many of these agents have been with us for more than 15 years and are seen more as partners than business associates, enjoying the same high level of technical and commercial support that helped to establish our reputation in the UK. All have been supported over the years by Sales Director Alec Robshaw who joined BEKA in 1989 as the company’s seventh employee, since when he has travelled the world many times over in search of new business opportunities. Our ambition is to provide local, authoritative support for our product ranges throughout most of the world’s developed markets, the aim being to maintain and expand our recognised market leadership for the supply of hazardous area display instrumentation.

Full details of the BEKA distribution network of more than fifty agents can be found via our website at www.beka.co.uk – please refer to the worldwide agents section. Each agent can provide full technical and commercial support for our rapidly expanding range of products and has been selected because of their expertise and knowledge of hazardous area technology and applications.

As a result of this continuing export focus, coupled with continuous new product development, we have enjoyed strong growth over recent years and have expanded our internal sales team to maintain our usual high level of customer service. Two additional Regional Sales Managers now also support our export activities, both of whom bring a wealth of experience and enthusiasm to the company. In the following pages we have profiled several of our overseas partners and introduced a few newsworthy items, to provide an insight into our overseas sales activities.
BEKA enjoys excellent coverage throughout Europe via an extensive network of agents, who in turn are supported by either Alec or Regional Sales Manager Chris Sadler. Chris has many years’ experience both at home and overseas, starting out as an installation and commissioning engineer in East Africa following his graduation from Brighton University. He has since furthered his career in process instrumentation sales and joined BEKA in 2004 after working within the pressure sensor market. Chris now looks after the Southern half of the UK as well as Northern and Eastern Europe plus the USA and Canada.

Most BEKA products carry ATEX approvals that allow wide access to all the major European markets. OEM sales into fellow instrument companies complement extensive end-user acceptance, with many sites adopting BEKA as their preferred supplier.

In Norway we are represented by Norex, an engineering-led company focussed solely on the sales and servicing of hazardous area process equipment within the extensive petrochemical and associated industries in the region. The BEKA agency significantly complements their other hazardous area offerings to the extent that they can now provide a complete spectrum of ‘Ex’ solutions, including products, seminars and technical support. Sales growth has been impressive and in 2006 they again exhibited at the Offshore North Sea (ONS) show in Stavanger, where BEKA products were on display alongside their other principal suppliers.
BEKA are represented in Ireland by Tektron, based in Cork, who celebrate their 21st anniversary in 2007. The renowned warmth of the Irish is amply personified in the guise of sales manager Adrian O’Mahoney, whilst MD Frank Urell offers a wealth of knowledge and experience gained from a lifelong career within the industry. Ireland enjoys one of the highest concentrations of pharmaceutical plants in the world, Puerto Rico perhaps being their only rival, with eight of the ten market leaders having facilities locally. Many of these plants were amongst the first to embrace the benefits of Fieldbus technology whilst our conventional instruments have always been popular within this dynamic market sector.

In Germany Mitex, who have been with BEKA since 1994, are a small family-run business who specialise in the design and supply of ‘Ex’ control panels and enclosures from their 400m² purpose-built premises near Hamburg.

The fast-developing market of Eastern Europe offers many interesting opportunities and our Czech agent D-Ex personifies an expert company focussed on supporting its local industry. As a specialist distributor they can provide a wide range of process instrumentation via offices in Brno and neighbouring Slovakia (Bratislava). Regular visits by Chris Sadler have helped to develop our presence in the various market sectors that rely on certified equipment usage on their plants, a service he happily performs here and elsewhere by offering product training and customer visits. We assisted our Hungarian agent Muker by supporting the DCS-12 event in 2006 held in a beautiful chateau in the mountains near Miskolc, a conference and exhibition that focussed not only on control systems but also on Fieldbus solutions.
Dave Turner joined BEKA in November 2005 as Regional Sales Manager for the whole Asia Pacific and Middle East regions. He has nearly thirty years instrumentation experience including design, product approval and marketing and since joining the company has been actively involved in raising the profile of BEKA throughout this large geographical area. One of his first priorities was to gain vendor pre-qualification with the various Middle East oil majors and to establish local support within each country. Now that much of this work has been completed BEKA has already gained some notable successes, including installations at Ras Laffan in Qatar, Dalian Petrochemical in China and ODG III in Abu Dhabi.

In South Africa we are ably supported by our longstanding agent Extech, who were appointed as our local representative back in 1989. Their Technical Manager K V Dahya has been with the company for nearly 20 years and is well known locally for his extensive knowledge of Intrinsically Safe applications and products, which in turn has led them to a position of strong market leadership throughout the region. Following the retirement of former owner Andrew Jaworski they have become part of Temperature Controls, who in turn have been in business selling sensors and solutions since 1935. As a much larger company with offices in Johannesburg, Cape Town and Durban they now offer the wherewithal for further expansion and market development.

BEKA supported the 3rd Multaqa Fieldbus Exhibition and conference held in Bahrain in December 2006 where we naturally took the opportunity to demonstrate our award-winning single variable Fieldbus indicators, which have been designed to provide clear and visible indication of process variables in remote and possibly hostile environmental conditions. The conference programme included end-users sharing issues and success stories with this emergent technology whilst vendors showcased their latest products to a receptive audience.
In the USA our distribution partner Exloc has experienced phenomenal growth over recent years, with most BEKA products enjoying significant uptake. Recent successes have included orders for the revamp of the large Shell Norco chemical plant in New Orleans – one of the first customers for the BEKA Fieldbus indicators – and some major OEM business in the Houston area. With the benefit of a robust and long-standing partnership Exloc is a good example of how we aim to work closely with our agents to ensure that the appropriate level of customer support and satisfaction is achieved. Most BEKA intrinsically safe products now have FM certification to allow installation throughout the USA (and elsewhere) and we have now received our first Canadian approvals to further extend Exloc’s geographical reach.

Looking further South, Brazil is the largest and most influential country in South America and is not only self-sufficient in oil but is enjoying rapid growth in the renewable energy sector. Our Brazilian agent Sense Electronica has been manufacturing I.S products for over 30 years and employs around 160 people in their manufacturing plant in Santa Rita do Sapucaí. They also have a large sales office in Sao Paolo employing another 65 people, who in turn support several other regional offices and representatives throughout this large country. As the market-leading domestic supplier for CEPEL approved sensors and interface devices, Sense are a key supplier to all the major petrochemical, pharmaceutical and related markets and boast customers such as Petrobras, Du Pont, BASF, Braskem and Petroquímica União SA.

On a more general note, our Fieldbus indicator ranges have quickly established themselves as a unique and versatile solution for both FOUNDATION Fieldbus™ and Profibus applications. We have therefore been pleased to enter into a global preferred supplier agreement with Yokogawa and have worked closely with most of the other leading DCS companies to ensure complete interoperability with their systems. In 2007 the products gained further recognition via a design award for ‘technical innovation’ – an award we were glad to accept from award sponsor and recognised hazardous area specialist company, R. Stahl.
An extensive range of loop powered 4/20mA indicators, including models for field and panel mounting in safe and hazardous areas with digital and analogue displays.

Accessories including loop and separately powered backlights, alarms, square root extractors and linearisers. ATEX and IECEx certified field mounting ‘D’ models are now available with approval for installation in combustible dusts.

All the intrinsically safe instruments have ATEX and FM certification and some also have IECEx international approval. For installations in Zone 2 without barriers or isolators, ATEX certified Type nL models and FM Approved nonincendive models are available.

Indicators are supplied calibrated to customers’ requirement free of charge and if required they can be labeled to show units of measurement, tag number and application.

To select the model for your application, please refer to the summary on the following page.

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**Indicateurs auto alimentés 4.20 mA**

Une gamme complète d’indicateurs 4-20mA, incluant des versions encastrés et pour site en zones saines ou à risques. Tous les modèles pour zones à risques sont certifiés ATEX et FM et la plupart sont également certifiés IECEx. Des options telles que alarmes, extraction de racine carrée, linéarisation, rétro éclairage étendent leur champ d’application.

**Stromschleifengeräte 4/20mA , Digitalanzeigen**


**Indicadores 4/20mA alimentados por lazo**

Una amplia gama de indicadores, 4/20mA alimentados por lazo, incluyen modelos para montaje en campo y panel tanto en zona peligrosa como en zona segura. Todos los modelos intrínse- camente seguros tienen certificación ATEX y FM y muchos también IECEx. La gran variedad de accesorios como alarmas, extracción de raíz cuadrada, linealización y luz trasera amplían las aplicaciones de estos instrumentos.
Select a loop-powered 4/20mA indicator for your application from:

### Intrinsically safe models

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<tr>
<th>Model</th>
<th>BA304C*</th>
<th>BA304D</th>
<th>BA307C</th>
<th>BA308C</th>
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* Superseded by ‘D’ model shown in following column

### Type InL models

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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>External keypad</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
The BA304C is an intrinsically safe field mounting indicator which displays the current flowing in a 4/20mA process loop in meaningful engineering units. The indicator has a 25mm high, easy to read liquid crystal display, and is housed in a robust IP66 enclosure. Modular accessories enable only the required features to be incorporated, thus reducing cost while retaining interchangeability between instruments.

Main application of the BA304C is to display a measured variable or control signal in a hazardous process area. The zero and span of the display are independently adjustable so that the indicator can be calibrated to display any variable represented by a 4/20mA current, such as temperature, pressure, level or actuator position. When used with a differential flow transmitter an optional square root extractor allows the BA304C to display flow in linear engineering units.

Two alternative backlight options are available. The loop powered backlight produces green background illumination enabling the display to be read at night and in poor lighting conditions. It does not require an additional power supply, IS interface or field wiring, but the indicator voltage drop is increased. The separately powered backlight provides a bright orange output to enhance daylight viewing, but requires an additional IS interface and field wiring.

An optional internal calibrator simulates a 4 and 20mA input current so that the indicator may be recalibrated without the need for test equipment or disconnection from the 4/20mA loop. Although not providing independent verification, it is an effective way to quickly check performance or to recalibrate.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The indicator is protected from reverse connection and overrange input current, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.

Use BA304D for new installations

BA304C
2-wire 4/20mA
3½ digit indicator

Intrinsically safe for use in all gas hazardous areas

◆ Loop powered only 1V drop

◆ Intrinsically safe
ATEX & FM certification

◆ ±1999 display
25.4mm high

◆ Optional:
Loop powered backlight
Separately powered backlight
Root extractor
Calibrator

◆ IP66 & NEMA 4
GRP or aluminium enclosure

◆ 3 year guarantee
**SPECIFICATION**

**Input**
- Current: 4 to 20mA
- Voltage: Less than 1V at 20˚C
- Less than 1.1V at -20˚C
- Less than 5V when loop-powered backlight is fitted
- Overrange: ±200mA will not cause damage

**Display**
- Type: 3½ digit (-1999 to 1999)
- Liquid crystal 25.4mm high
- Span: Adjustable between 000 & 1999 for a 4 to 20mA input.
- Zero: Adjustable between ±1000 with 4mA input.
- Decimal point: 1 of 3 positions or absent
- Polarity: Automatic minus sign
- Direction: Display may increase or decrease with increasing current. Factory set option.
- Reading rate: 2.5 per second
- Overrange: 3 least significant digits are blanked

**Accuracy**
- At 20˚C: ±1 digit
- Temperature effect on:
  - Zero: Typ ±0.05 digit ±100ppm/˚C
  - Max ±0.1 digit ±200ppm/˚C
  - Span: Typ ±50ppm; max ±100ppm/˚C
- Series mode rejection: Typ 1 digit error for 1mA pk to pk 50Hz signal.

**Intrinsic safety**
- Europe ATEX
  - Standard: EN 50 020 : 1994
  - Code: Group II, Category 1G
  - Cert No: TIS02ATEX2027
- Output parameters:
  - Uo: 1.1V dc
  - Io: 70mA dc
  - Po: 23mW
  - Ceq: 10nF
  - Lqe: Apparatus
- Location: Zone 0, 1 or 2
- Installation: The BA304C may be connected to any certified intrinsically safe circuit whose output parameters do not exceed:
  - Uo: 30V dc
  - Io: 200mA dc
  - Po: 0.85W

**USA FM**
- Standard: 3610 Entity
- Code: Div I, II, III: Div 1: GP A, B, C, D, E, F & G
- Temperature code: T4 at 60˚C
- File No: 4B3A7.AX

**Environmental**
- Operating temp: -20 to +60˚C (Certified for use at -40˚C)
- Storage temp: -40 to +65˚C
- Humidity: To 95% at 40˚C
- Enclosure: IP66 see ERA test report 5046/228, NEMA 4 see OQ2A9.AX
- Immunity: Less than 2% of span error for 10V/m field strength between 27MHz & 1 GHz.
- Emissions: Undetectable above background noise.

**Mechanical**
- Terminals: Screw clamp for 0.5 to 2.5mm² cables
- Weight: GRP enclosure 1kg

**Accessories**
- Loop powered backlight: Green; powered from 4/20mA current. Voltage drop of indicator plus backlight less than 5V.
- Separately powered backlight: Orange, powered from 28V 300Ω.
- Root extractor: Not available with calibrator
- Accuracy: ±6µA at input ±1 digit for inputs between 4.16 and 20mA (10 to 100% of flow)
- Clip-off: Selectable by internal plug-in link, operates at 4.04mA input (5% of flow)

**How to Order**
- Model number: BA304C
- Enclosure: GRP or aluminium
- Display at 4mA: XXXX
- Display at 20mA: XXXX

**Terminal Connections**
- Calibrator: Simulates 4 and 20mA input, selected by plug-in link accessible when enclosure cover is removed. Not available with root extractor
- Etched scale plate: Removable blank stainless steel plate fitted to each indicator, can be supplied etched with units of measurement. See accessory datasheet for details of legend size.
- Etched tag plate: Removable blank stainless steel plate fitted to each indicator, can be supplied etched with tagging information. See accessory datasheet for details of legend size.
- Pipe mounting kit: 2 kits are available BA392C and BA393, see accessory datasheet for details.
- Panel mounting kit: BA394 mounts BA304C into a panel aperture. See accessory datasheet.

**How to Specify**
- Loop powered backlight or Separately powered backlight.
- Root extractor
- Only one can be fitted

**DIMENSIONS (mm)**

**TERMINAL CONNECTIONS**

**ENVIRONMENTAL**

**MECHANICAL**

**ACCESSORIES**
The new BA304D is a third generation intrinsically safe field mounting indicator housed in a robust IP66 GRP enclosure incorporating a separate terminal compartment and dedicated access to the instrument controls. Providing all the features of the popular BA304C, this new indicator provides improved display visibility, plus simplified installation, calibration and routine inspection facilities.

Like its predecessor, the BA304D displays the current flowing in a 4/20mA loop in accurate engineering units. The instrument is loop powered but only introduces a 1V drop allowing it to be installed in series with almost any 4/20mA loop.

Main application of the BA304D is to display a measured variable or control signal in a hazardous process area. The zero and span of the display are independently adjustable so that the indicator can be calibrated to display any variable represented by a 4/20mA current, such as temperature, pressure, level or actuator position. When used with a differential flow transmitter an optional square root extractor enables the BA304D to display flow in linear engineering units.

The enclosure which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection which has been independently assessed by ITS - report available. A separate terminal compartment allows the instrument to be installed and terminated without exposing the display electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and the clamping screws are both forward facing. Additional terminals are provided which may be used to link the return 4/20mA conductor and the cable screens. A separate sealed cover provides access to the plug-in calibration links and potentiometers without exposing the display electronics or field terminals.

International intrinsic safety certification allows the BA304D to be installed throughout the world. The 4/20mA input terminals comply with the requirements for simple apparatus enabling the indicator to be connected in series with most certified intrinsically safe circuits; together with the low voltage drop, this makes the instrument very easy to apply. ATEX and FM approvals permit installation in Europe and the USA, and IECEx certification allows installation in a growing number of countries including Australia and New Zealand.

Two alternative backlight options are available. The loop powered backlight produces green background illumination enabling the display to be read at night and in poor lighting conditions. It does not require an additional power supply, IS interface or field wiring, but the indicator voltage drop is increased. The separately powered backlight provides a bright orange output to enhance daylight viewing, but it requires an additional IS interface and field wiring.

An optional internal calibrator simulates a 4 and 20mA input current so that the indicator may be recalibrated without the need for test equipment or disconnection from the 4/20mA loop. Although not providing independent verification, it is an effective way to quickly check performance or to recalibrate.

Units of measurement and the instrument application or tag number can be economically marked onto the display escutcheon prior to despatch or after installation on-site. Alternatively, for customers who prefer an etched stainless steel label, the indicator can be supplied with a removable blank or custom etched stainless steel plate mounted on the front of the instrument.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The BA304D is protected from reverse connection and over-range input currents and incorporates extensive radio frequency filtering to comply with the European EMC Directive. The indicator assembly can be removed from the enclosure without disconnecting the field wiring or disturbing the 4/20mA loop, continuity being maintained by a diode within the terminal assembly.

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**BA304D**

2-wire 4/20mA

3½ digit indicator

*Intrinsically safe for use in gas and dust hazardous areas*

- Loop powered only
- 1V drop
- Intrinsically safe ATEX gas or ATEX gas & dust or FM & ATEX gas
- All models have IECEx certification
- ±1999 display
- 25.4mm high
- IP66 GRP enclosure with separate terminal compartment
- Optional: Backlight: loop or separately powered Root extractor Calibrator
- 3 year guarantee

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**BEKA associates Ltd.** Old Charlton Rd. Hitchin, Hertfordshire, SG5 2DA, U.K. Tel. (01462) 438301 Fax (01462) 453971 e-mail sales@beka.co.uk www.beka.co.uk
### SPECIFICATION

**Input**
- Current: 4 to 20mA
- Voltage: Less than 1V at 20°C
- Overrange: ±200mA will not cause damage

**Display**
- Type: Liquid crystal, 25.4mm high
- Zero: Adjustable between ±1000 with 4mA input.
- Span: Adjutable between 0 & 2000mA.
- Decimal point: 1 of 3 positions or absent
- Polarity: Automatic minus sign
- Direction: Display may increase or decrease with increasing current. Factory set option.
- Reading rate: 2.5 per second
- Over & underrange: 3 least significant digits are blanked

**Accuracy**
- At 20°C: ± 1 digit
- Temp. effect:
  - Zero: Typ ±0.05 digit ± 100ppm/°C, Max ±0.1 digit ± 200ppm/°C
  - Span: Typ ±50ppm/°C, Max ±100ppm/°C
- Series mode: Typ 1 digit error for 1mA pk to pk 50Hz or 60Hz signal.

**Intrinsic safety**
- Europe ATEX
  - Standard EN50020:1994
  - Code Group II Category 1G, EEx ia IIC T5 (Tamb = -40 to 60°C)
  - Or Group II Category 1GD, T80˚C IP66

**Output parameters**
- Uo: 1.1V dc
- Io: 70mA dc
- Po: 23mW
- Leq: 10uH

**USA FM**
- Option, see How to order
- Standard: 3610 Entity
- Code: CL I, II, III: Div 1: GP A, B, C, D, E, F & G
- File: 3080809

**International IECEx**
- Standard: IEC60079-11:1999
- Code: Ex ia IIC T5, Ta = -40 to 60°C
  - Or Ex ia IIC T5 DIP A21 TA 80˚C IP66
- Cert. No: IECEx ITS 05.0004

**Environmental**
- Operating temp: -20 to +60°C (ATEX gas certification -40 to 60°C)
- Storage temp: -40 to +85°C
- Humidity: To 95% at 40°C
- Immunity: Less than 1% of span error for 10V/m field strength between 27MHz and 1GHz.
- Emissions: Undetectable above background noise Class B equipment

**Mechanical**
- Terminals: Screw clamps for 0.5 to 1.5mm² cables
- Weight: 1.6kg

**Accessories**
- Loop powered backlight
- Green; powered from 4/20mA current, Voltage drop of indicator plus backlight less than 5V.
- Separately powered backlight:
  - Orange; powered from 28V 300 Ω Zener barrier or galvanic isolator.
- Root extractor
  - Accuracy: ±16µA at input ±1 digit for inputs between 4.16 and 20mA (10 to 100% flow)
  - Clip-off: Selectable by plug in link. Operates at 4.06mA (5% flow).
  - Not available with calibrator

**How to order**

**DIMENSIONS (mm)**

**TERMINAL CONNECTIONS**

**USA FM**
- Option, see How to order
- Standard: 3610 Entity
- Code: CL I, II, III: Div 1: GP A, B, C, D, E, F & G
- File: 3080809

**International IECEx**
- Standard: IEC60079-11:1999
- Code: Ex ia IIC T5, Ta = -40 to 60°C
  - Or Ex ia IIC T5 DIP A21 TA 80˚C IP66
- Cert. No: IECEx ITS 05.0004

**Environmental**
- Operating temp: -20 to +60°C (ATEX gas certification -40 to 60°C)
- Storage temp: -40 to +85°C
- Humidity: To 95% at 40°C
- Immunity: Less than 1% of span error for 10V/m field strength between 27MHz and 1GHz.
- Emissions: Undetectable above background noise Class B equipment

**Mechanical**
- Terminals: Screw clamps for 0.5 to 1.5mm² cables
- Weight: 1.6kg

**Accessories**
- Loop powered backlight
- Green; powered from 4/20mA current, Voltage drop of indicator plus backlight less than 5V.
- Separately powered backlight:
  - Orange; powered from 28V 300 Ω Zener barrier or galvanic isolator.
- Root extractor
  - Accuracy: ±16µA at input ±1 digit for inputs between 4.16 and 20mA (10 to 100% flow)
  - Clip-off: Selectable by plug in link. Operates at 4.06mA (5% flow).
  - Not available with calibrator

**How to order**

**Please specify**
- Model number: BA304D
- Certification: ATEX gas
  - Or ATEX gas & dust
  - Or FM & ATEX gas
- Display at 4mA: XXXX Include position of decimal
- Display at 20mA: XXXX point & sign if negative *
- Scale legend:
  - Units of measurement marked onto display escutcheon.
- Tag legend:
  - Tag number or applicational information marked onto display escutcheon.
- Stainless legend:
  - Stainless steel plate secured to front of enclosure, etched with tagging or applicational information.
- Pipe mounting kit:
  - 2 kits are available BA392D and BA393
  - # See accessory datasheet for details

**Calibrator**
- Simulates 4 and 20mA input, selected by plug-in link.
- Not available with root extractor

**Scale legend**:
- Units of measurement marked onto display escutcheon.

**Tag legend**:
- Tag number or applicational information marked onto display escutcheon.

**Stainless legend**:
- Stainless steel plate secured to front of enclosure, etched with tagging or applicational information.

**Pipe mounting kit**:
- 2 kits are available BA392D and BA393

* Will be set to display 00.0 at 4mA and 100.0 at 20mA if calibration information is not supplied.
The BA304NC is a Type nL certified field mounting indicator which displays the current flowing in a 4/20mA process loop in engineering units. This indicator has a 25mm high 3½ digit liquid crystal display and is available in an IP66 aluminium or GRP enclosure.

For most new installations the recently introduced BA304ND indicator, which has a separate terminal compartment and an extended range of accessories, should be used. The BA304NC has been retained for customers requiring an aluminium enclosure, or compatibility with earlier ‘C’ instruments.

Main application of the BA304NC is to display a measured variable or control signal in a Zone 2 hazardous process area. The zero and span of the display are independently adjustable so that the indicator can be calibrated to display any variable represented by a 4/20mA current, such as temperature, pressure, level or actuator position. When used with a differential flow transmitter an optional square root extractor allows the BA304NC to display flow in linear engineering units.

Separately powered backlighting is available as an option. The orange output enhances daylight contrast and enables the display to be read when the instrument is installed in a poorly illuminated area.

An EC Declaration of Conformity has been issued to show that the BA304NC complies with the requirements for Group II Category 3G equipment defined in the European ATEX Directive 94/9/EC. This allows the indicator to be installed in a Zone 2 hazardous areas without Zener barriers or galvanic isolators. For Zone 2 applications, Type ‘n’ protection offers a less expensive alternative than intrinsic safety or flameproof techniques.

Two types of enclosure are available, each has stainless steel fittings and a polycarbonate window and is sealed with a neoprene gasket. The sturdy glass reinforced polyester (GRP) enclosure is suitable for most industrial applications including offshore and water treatment. For installation where solvents may be encountered, the epoxy painted aluminium enclosure provides maximum protection. Both the GRP and aluminium enclosures, which have been tested by ERA, provide IP66 protection as specified in BS5490. To simplify installation, the BA304NC is fitted with additional terminals which may be used to link the return 4/20mA conductor and the cable screen. The indicator assembly can be removed from the enclosure without disconnecting the field wiring or disturbing the 4/20mA loop, continuity being maintained by a diode within the terminal assembly.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The indicator is protected from reverse connection and overrange input current, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.
SPECIFICATION

Input
Current 4 to 20mA
Voltage Less than 1V at 20˚C
Less than 1.1V at -20˚C
Overrange ±200mA will not cause damage

Display
Type 3½ digit -1999 to 1999
Liquid crystal 25mm high
Span Adjustable between 000 & 1999
for a 4 to 20mA input.
Zero Adjustable between ±1000 with
4mA input.
Decimal point 1 of 3 positions or absent
Polarity Automatic minus sign
Direction Display may increase or decrease
with increasing current. Factory set
option.
Reading rate 2.5 per second
Overrange 3 least significant digits are blanked

Accuracy
At 20˚C ±1 digit
Temperature affect on:
Zero Typ ±0.05 digit ±100ppm/˚C
Max ±0.1 digit ±200ppm/˚C
Span Typ ±50ppm; max ±100ppm/˚C
Series mode rejection Typ 1 digit error for 1mA pk to pk
50Hz signal.

Type n certification
ATEX
EC Declaration of Conformity
Code Group II, Category 3G, EEx nL T5
Tamb EN 50021:1999
Standard Location Zone 2
Cert. No. BEKA03ATEX0015
Installation The BA304NC may be connected in
series with most 4/20mA Zone 2 circuits
providing maximum current in normal
operation is less than 40mA. See
Declaration of Conformity and instruction
manual for full installation details.

Environmental
Operating temperature -20 to +60˚C (Certified for use
at -40˚C)
Storage temperature -40 to +85˚C
Humidity To 95% at 40˚C
Enclosure IP66 see ERA test report 5046/228
EMC In accordance with EU Directive
89/336/EEC, full report available.

Mechanical
Terminals Screw clamp for 0.5 to 2.5mm² cables
Weight GRP enclosure 1kg
Aluminium enclosure 1.3kg

Accessories
Separately powered backlight LED backlight powered from
18 to 30V dc supply
Root extractor ±16µA at input ±1 digit for inputs
Accuracy between 4.16 and 20mA
Clip-off (10 to 100% of flow)
Removable blanket stainless steel plate
fitted to each indicator, can be supplied
etched with units of measurement. *
Etched scale plate Removable blanket stainless steel plate
fitted to each indicator, can be supplied
etched with tagging information. *
Etched tag plate 2 kits are available BA392C and BA393
Pipe mounting kit BA394 mounts BA304NC into a panel
aperture*
Pipe mounting kit 2 kits are available BA392C and BA393
Panel mounting kit BA394 mounts BA304NC into a panel
aperture*

DIMENSIONS (mm)

TERMINAL CONNECTIONS

HOW TO ORDER

Please specify
Model number BA304NC
Display at 4mA XXXX
Display at 20mA XXXX
Accessories
Please specify if required
Separately powered backlight
Root extractor Legend
Legend BA392C or BA393
BA394
BA394

Please specify if required
Separately powered backlight
Root extractor Legend
Legend BA392C or BA393
BA394
BA394

*Will be set to display 00.0 at 4mA and 100.0 at 20mA if calibration information
is not supplied.
The BA304ND is a Type nL certified field mounting indicator housed in a robust IP66 GRP enclosure incorporating a separate terminal compartment and dedicated access to instrument controls. Retaining all the features of the popular BA304NC, this replacement indicator provides improved display visibility, plus simplified installation, calibration and routine inspection facilities.

Like its predecessor, the BA304ND displays the current flowing in a 4/20mA loop in accurate engineering units. The instrument is loop powered but only introduces a 1V drop allowing it to be installed in series with almost any 4/20mA loop.

Main application of the BA304ND is to display a measured variable or control signal in a Zone 2 hazardous process area. The zero and span of the display are independently adjustable so that the indicator may be calibrated to display any variable represented by a 4/20mA current, such as temperature, pressure, level or actuator position. When used with a differential flow transmitter an optional square root extractor enables the BA304ND to display flow in linear engineering units.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection which has been independently assessed by ITS - report available. A separate terminal compartment allows the instrument to be installed and terminated without exposing the display electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and the clamping screws are both forward facing. Additional terminals are provided which may be used to link the return 4/20mA conductor and the cable screens. A separate sealed cover provides access to the plug-in calibration links and potentiometers without exposing the display electronics or field terminals.

A Type nL Certificate of Conformity has been issued by ITS confirming compliance with the EN60021:1999 standard for Zone 2 electrical apparatus. Based on this third party assessment, an EC Declaration of Conformity shows that the BA304ND complies with the requirements for Group II, Category 3G equipment defined in the ATEX Directive 94/9/EC. This allows the indicator to be installed in Zone 2 hazardous areas without Zener barriers or galvanic isolators. For Zone 2 applications the BA304ND offers a less expensive alternative to intrinsic safety or flameproof instrumentation.

Two alternative backlight options are available. The loop powered backlight produces green background illumination enabling the display to be read at night and in poor lighting conditions. It does not require an additional power supply but the indicator voltage drop is increased. The separately powered backlight provides a bright orange output to enhance daylight viewing, but an additional power supply and field wiring are required.

An optional internal calibrator simulates a 4 and 20mA input current so that the indicator may be recalibrated without the need for test equipment or disconnection from the 4/20mA loop. Although not providing independent verification, it is an effective way to quickly check performance or to recalibrate.

Units of measurement and the instrument application or tag number can be economically marked onto the display escutcheon prior to despatch or after installation on-site. Alternatively, for customers who prefer an etched stainless steel label, the indicator can be supplied with a custom etched stainless steel plate mounted on the front of the instrument.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The BA304ND is protected from reverse connection and over-range input currents and incorporates extensive radio frequency filtering to comply with the European EMC Directive. The indicator assembly can be removed from the enclosure without disconnecting the field wiring or disturbing the 4/20mA loop, continuity being maintained by a diode within the terminal assembly.
**SPECIFICATION**

**Input**
- Current: 4 to 20mA
- Voltage: Less than 1V at 20°C
  - Less than 1.1V at -20°C
- Overrange: ±200mA will not cause damage

**Display**
- Type: Liquid crystal, 25.4mm high
- Zero: Adjustable between ±1000 with 4mA input.
- Span: Adjustable between 0 & 1999 for a 4 to 20mA input.
- Decimal point: 1 of 3 positions or absent
- Polarity: Automatic minus sign
- Direction: Display may increase or decrease with increasing current. Factory set option.
- Reading rate: 2.5 per second
- Over & underrange: 3 least significant digits are blanked

**Accuracy**
- At 20°C: ± 1 digit
- Temp. effect
  - Zero: Typ ±0.05 digit ± 100ppm/°C
  - Max ±0.1 digit ± 200ppm/°C
- Span: Typ ±50ppm/°C: Max ±100ppm/°C
- Series mode: Typ 1 digit error for 1mA pk to pk 50Hz or 60Hz signal.

**Environmental**
- Operating temp: -20 to +60°C (Certified for use at -40°C)
- Storage temp: -40 to +85°C
- Humidity: To 95% at 40°C
- Enclosure: IP66

**Mechanical**
- Terminals: Screw clamps for 0.5 to 1.5mm² cables
- Weight: 1.6kg

**Accessories**
- Loop powered backlight: Green; powered from 4/20mA current. Voltage drop of indicator plus backlight less than 5V.
- Separately powered backlight: Orange; powered from 18 to 30V dc supply.
- Root extractor accuracy: ±16µA at input ±1 digit for inputs between 4.16 and 20mA (10 to 100% flow)
- Clip-off: Selectable by plug-in link. Operates at 4.04mA (5% flow).
  - Not available with calibrator
- Calibrator: Simulates 4 and 20mA input, selected by plug-in link.
  - Not available with root extractor

**Type nL certification**
- Certificate of Conformity
  - Standard: BS EN50021:1999
  - Code: EEx nL T5
  - Temp: -40 to 60°C
  - Cert. No: ITS Ex99Y4003

**ATEX**
- EC Declaration of Conformity
  - Code: Group II, Category 3G
  - Location: Zone 2
  - Cert. No: N0010

**Terminals Connections**
- Terminals 2 & 4 internally linked for joining return 4/20mA wire.
- Terminals 5 & 6 internally linked for joining cable screens.

**Terminal Connections**
- Scale legend: Units of measurement marked on display escutcheon.
- Tag legend: Tag number or applicational information marked on display escutcheon.
- Stainless legend plate: Stainless steel plate secured to terminal cover, etched with tagging or applicational information.
- Pipe mounting kit: 2 kits are available BA392D & BA393

**Scale**
- Model number: BA304ND
- Display at 4mA: XXXX
- Display at 20mA: XXXX

**Accessories**
- Display backlight: Loop powered backlight
- Root extractor: Root extractor
- Calibrator: Calibrator

**Escutcheon marking**
- Scale: Scale legend
- Tag: Tag legend

**Howard**
- Stainless legend plate: Legend plate
- Pipe mounting kit: BA392D or BA393

*Will be set to display 00.0 at 4mA and 100.0 at 20mA if calibration information is not supplied.*
The BA307C is an intrinsically safe panel mounting indicator which displays the current flowing in a 4/20mA process loop in meaningful engineering units. The instrument is loop powered but only introduces a 1V drop allowing it to be installed in series with almost any 4/20mA loop.

Main application of the BA307C is to display a measured variable or control signal in a hazardous process area. The zero and span of the display are independently adjustable so that the indicator can be calibrated to display any linear variable represented by a 4/20mA signal, such as temperature, pressure, level or actuator position. For flow applications an optional square root extractor enables the output from a differential flow transmitter to be displayed in linear engineering units.

Two backlight options are available. The loop powered backlight produces green background illumination enabling the display to be read at night and in poor lighting conditions. No additional power supply, IS interface or field wiring are required, but the indicator voltage drop is increased. Alternatively, the separately powered backlight has a bright orange output which enhances daylight viewing, but an additional IS interface and field wiring are required.

An optional internal calibrator simulates 4 and 20mA input currents and enables the indicator to be calibrated without the need for test equipment or disconnection from the 4/20mA loop. Although not providing independent verification, it is an effective way to quickly check performance or to recalibrate.

International intrinsic safety certification allows the BA307C to be installed throughout the world. The 4/20mA input terminals comply with the requirements for simple apparatus enabling the indicator to be connected in series with most certified intrinsically safe circuits which, together with the low voltage drop, make the instrument very easy to apply. ATEX and FM approvals permit installation in Europe and the USA and the IECEx certification allows installation in a growing number of countries including Australia and New Zealand. Selection of Zener barriers and galvanic isolators is described in Application Guide AG300.

The front panel is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. A captive neoprene gasket provides an IP65 seal between the enclosure and the panel.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The indicator is protected from reverse connection and overrange input current, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.

Complementary indicators for use in safe areas are available, see datasheet for BA507C.
**SPECIFICATION**

**Input**
- Current: 4 to 20mA
- Voltage: Less than 1V at 20˚C
  - Less than 1.1V at -20˚C
  - Less than 5V when loop-powered backlight is fitted
- Overrange: ±200mA will not cause damage

**Display**
- Type: 3½ digits (1999 to 1999)
  - Liquid crystal 12.7mm high
- Span: Adjustable between 000 & 1999 for a 4 to 20mA input.
- Zero: Adjustable between ±1000 with 4mA input.
- Decimal point: 1 of 3 positions or absent
- Polarity: Automatic minus sign
- Direction: Display may increase or decrease with increasing current. Factory set option.
- Reading rate: 2.5 per second
- Overrange: 3 least significant digits are blanked

**Accuracy**
- At 20˚C: ±1 digit
- Temperature effect on:
  - Zero: Typ ±0.05 digit, ±100ppm/˚C
  - Max ±0.1 digit, ±200ppm/˚C
  - Span: Typ ±50ppm; max ±100ppm/˚C
- Series mode rejection: Typ 1 digit error for 1mA pk to pk 50Hz signal

**Intrinsic safety**
- Europe ATEX
  - Standard: EN50 020:1994
  - Code: Group II, Category 1G
  - Certificate No.: ITS02ATEX2027
- USA FM
  - Standard: 3610 Entity
  - Code: CL I: Div 1: GP A, B, C, D
  - Temperature code: T4 at 60˚C
  - File No: 4B3A7.AX
  - Nonincendive
  - Code: CL I: Div 2: GP A, B, C & D
  - File No: 4B3A7.AX
- International IECEx
  - Standard: IEC60079-11:1999
  - Code: Ex ia IIC T5 Ta = -40 to 60˚C
  - Certificate No: IECEx ITS 05.0002

**Environmental**
- Operating temp: -20 to +60˚C (certified for use at -40˚C)
- Storage temp: -40 to +85˚C
- Humidity: To 95% at 40˚C non-condensing
- Enclosure: Front IP65; Rear IP20
- Immunity: Less than 1% of span error for 10V/m field strength between 27MHz & 1GHz.

**Mechanical**
- Terminals: Screw clamp for 0.5 to 1.5mm² cables in blue removable terminal block.
- Weight: 0.3kg

**Accessories**
- Loop powered backlight: Green; powered from 4/20mA current. Voltage drop of indicator plus backlight less than 5V.
- Separately powered backlight: Orange; powered from 28V 300Ω barrier or galvanic isolator.
- Root extractor: Not available with calibrator
  - Accuracy: ±16μA at input ±1 digit for inputs between 4.16 and 20mA (10 to 100% of flow)
  - Clip-off: Selectable by internal plug-in link, operates at 4.04mA input (5% of flow)
  - Calibrator: Simulates 4 and 20mA input, selected by plug-in link accessible through rear panel.
  - Not available with root extractor
  - Typeset scale card: Blank scale card fitted to each indicator can be supplied. Typeset with units of measurement.
  - Tag number: Thermally printed number on rear of the instrument.

**DIMENSIONS (mm)**

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

**Recommended panel cut-out**
- DIN 43 700
- 92.0 ±0.8/0.0 x 45 ±0.6/0.0
- To achieve an IP65 seal between the instrument and the panel
- 90 ±0.5/0.0 x 43.5 ±0.5/0.0

**TERMINALS**

- Terminals for optional backlight are shown in outline
- Terminals 2 & 4 are internally linked for joining return 4/20mA wire

**MODEL NUMBER**

- Display at 4mA XXXX
- Include position of decimal point & sign if negative
- Accessories
  - Backlight
  - Root extractor
  - Calibrator
  - Scale card
  - Tag number

**Accessories if required:**

- Loop powered backlight
- Separately powered backlight
- Root extractor
- Calibrator
- Scale card
- Tag number

**Legend**

- Only one can be fitted
- Will be set to display 00.0 at 4mA and 100.0 at 20mA with linear display if calibration information is not supplied.
The BA308C is an intrinsically safe panel mounting indicator which displays the current flowing in a 4/20mA process loop in meaningful engineering units. The instrument is loop powered but only introduces a 1V drop allowing it to be installed in series with almost any 4/20mA loop.

Main application of the BA308C is to display a measured variable or control signal in a hazardous process area. The zero and span of the display are independently adjustable so that the indicator can be calibrated to display any linear variable represented by a 4/20mA signal, such as temperature, pressure, level or actuator position. For flow applications an optional square root extractor enables the output from a differential flow transmitter to be displayed in linear engineering units.

Two backlight options are available. The loop powered backlight produces green background illumination enabling the display to be read at night and in poor lighting conditions. No additional power supply, IS interface or field wiring are required, but the indicator voltage drop is increased. Alternatively, the separately powered backlight has a bright orange output which enhances daylight viewing, but an additional IS interface and field wiring are required.

An optional internal calibrator simulates 4 and 20mA input currents and enables the indicator to be calibrated without the need for test equipment or disconnection from the 4/20mA loop. Although not providing independent verification, it is an effective way to quickly check performance or to recalibrate.

International intrinsic safety certification allows the BA308C to be installed throughout the world. The 4/20mA input terminals comply with the requirements for simple apparatus enabling the indicator to be connected in series with most certified intrinsically safe circuits which, together with the low voltage drop, make the instrument very easy to apply. ATEX and FM approvals permit installation in Europe and the USA and the IECEx certification allows installation in a growing number of countries including Australia and New Zealand. Selection of Zener barriers and galvanic isolators is described in Application Guide AG300.

The front panel is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. A captive neoprene gasket provides an IP65 seal between the enclosure and the panel.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The indicator is protected from reverse connection and overrange input current, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.

Complementary indicators for use in safe areas are available, see datasheet for BA508C.
**SPECIFICATION**

**Input**
- Current: 4 to 20mA
- Voltage: Less than 1V at 20°C, less than 1.1V at -20°C, less than 5V when loop-powered backlight is fitted
- Overrange: ±200mA will not cause damage

**Display**
- Type: 3½ digit (-1999 to 1999)
- Span: Adjustable between 000 & 1999 for a 4 to 20mA input.
- Zero: Adjustable between ±1000 with 4mA input.
- Decimal point: 1 of 3 positions or absent
- Polarity: Automatic minus sign
- Direction: Display may increase or decrease with increasing current. Factory set option.
- Reading rate: 2.5 per second
- Overrange: 3 least significant digits are blanked

**Accuracy**
- At 20°C: ±1 digit
- Temperature effect on:
  - Zero: Typ ±0.05 digit ±100ppm/°C, Max ±0.1 digit ±200ppm/°C
  - Span: Typ ±50ppm, max ±100ppm/°C
- Series mode rejection: Typ 1 digit error for 1mA pk to pk 50Hz signal

**Intrinsic safety**
- Europe ATEX
  - Standard: EN50 020:1994
  - Code: Group II, Category 1G
  - Certificate No.: ITS02ATEX2027
- Output parameters:
  - Uo: 1.1V dc
  - Io: 70mA dc
  - Wo: 23mV
  - Ceq: 20nF
  - Leq: 10nH
- Location: Zone 0, 1 or 2
- Installation: The BA308C may be connected to any certified intrinsically safe circuit whose output parameters do not exceed:
  - Uo: 30V dc
  - Io: 200mA dc
  - Wo: 0.85W
- USA FM
  - Standard: 3610 Entity
  - Code: CL I: Div 1; GP A, B, C, D
  - Temperature code: T4 at 60°C
  - File No: 4BSA7.AX
- Standard: 3611 Nonincendive
  - Code: CL I: Div 2; GP A, B, C & D
  - File No: 4BSA7.AX
- International IECEx
  - Standard: IEC60079-11:1999
  - Code: Ex ia IIC T5
  - Cert. No.: IECEx ITS 05.0002
  - Operating temp: -20 to +60°C (certified for use at -40°C)
  - Storage temp: -40 to +85°C
  - Humidity: To 95% at 40°C non-condensing
  - Enclosure: Front IP65; Rear IP20
  - Immunity: Less than 1% of span error for 10V/m field strength between 27MHz & 1GHz.
  - Emissions: Undetectable above background noise.

**Mechanical**
- Terminals: Screw clamp for 0.5 to 1.5mm² cables in blue removable terminal block.
- Weight: 0.5kg

**Accessories**
- Loop powered backlight: Green; powered from 4/20mA current. Voltage drop of indicator plus backlight less than 5V.
- Separately powered backlight: Orange; powered from 28V 300Ω Zener barrier or galvanic isolator.
- Root extractor: Not available with calibrator
- Accuracy: ±16μA at input ±1 digit for inputs between 4.16 and 20mA (10 to 100% of flow) Selectable by internal plug-in link, operates at 4.04mA input (5% of flow) Not available with root extractor
- Clip-off: Simulates 4 and 20mA input, selected by plug-in link accessible through rear panel.
- Calibrator: Simulates 4 and 20mA at 20mA

**HOW TO ORDER**

**DIMENSIONS (mm)**

Recommended panel cut-out
- DIN 43 700
- 138.0 ±1.0/ -0.0 x 68.0 ±0.7/ -0.0
- To achieve an IP65 seal between the instrument and the panel
- 138.0 ±0.5/0.0 x 68.2 ±0.5/-0.0
- Four panel mounting clips must be used

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

**Model number**
- Display at 4mA
- at 20mA

**Accessories**
- Display backlight
- Root extractor
- Calibrator
- Scale card
- Tag number
- Front cover

**Legend**
- BA308C
- XXXX
- XXXX
- **XX**

**Please specify if required:**
- Loop powered backlight or
- Separately powered backlight
- Root extractor
- Only one
- Calibrator
- Legend
- BA398

"Will be set to display 00.0 at 4mA and 100.0 at 20mA with linear display if calibration information is not supplied."
The BA324C is an intrinsically safe field mounting indicator which displays the current flowing in a 4/20mA loop in meaningful engineering units. The indicator has a 20mm high, easy to read liquid crystal display, and is housed in a robust IP66 enclosure. Modular accessories enable only the required features to be incorporated thus reducing cost while retaining interchangeability between instruments.

Main application of the BA324C is to display a measured variable or control signal in a hazardous process area. The zero and span of the display are independently adjustable so that the indicator can easily be calibrated to display any linear or square law signal represented by a 4/20mA current, such as temperature, pressure or flow. An optional 16 point lineariser enables the BA324C to display non-linear variables in linear engineering units, and two optional alarms can control hazardous or safe area loads.

Calibration and programming of the indicator is performed via four sealed push-buttons located behind the instrument front cover where they are protected from damage and tampering. The calibration functions are contained in easy to understand menus which are accessed by entering a four digit user selectable security code.

Two backlight options are available. The loop powered backlight produces green back-ground illumination enabling the display to be read at night and in poor lighting conditions. No additional power supply, IS interface or field wiring are required, but the indicator voltage drop is increased. Alternatively, the separately powered backlight has a bright orange output which enhances daylight viewing, but an additional IS interface and field wiring are required.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed as high or low trips with normally open or closed contacts.

An internal calibrator simulates 4 and 20mA input currents so that the indicator may be calibrated without the need for test equipment or disconnection from the 4/20mA loop. Although not providing independent verification, it is an effective way to quickly check performance or to recalibrate.

ATEX intrinsic safety certification allows installation throughout Europe. The two 4/20mA input terminals comply with the requirements for simple apparatus allowing the BA324C to be connected in series with most certified intrinsically safe 4/20mA loops. This, together with the low voltage drop, makes the BA324C very easy to apply. FM certification permits the indicator to be installed in the USA. Selection of Zener barriers and galvanic isolators is described in Application Guide AG300.

Two types of enclosure are available, each has stainless steel fittings and a toughened glass window and is sealed with a neoprene gasket. The sturdy glass reinforced polyester (GRP) enclosure is suitable for most industrial applications including off-shore and water treatment. For installations where solvents may be encountered, the epoxy painted aluminium enclosure provides maximum protection. Both the GRP and aluminium enclosures, which have been tested by ERA, provide IP66 protection as specified in BS5490. To simplify installation, the BA324C is fitted with additional terminals which may be used to link the return 4/20mA conductor and the cable screen. The indicator assembly may be removed from the enclosure without disconnecting the field wiring or disturbing the 4/20mA loop, continuity being maintained by a diode within the terminal assembly.

Reliability is ensured by an ISO9001 approved quality control system backed by a three year guarantee. The indicator is protected from reverse connection and overrange input current, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.

BA324C
2-wire 4/20mA
4½ digit indicator

Intrinsically safe for use in all gas hazardous areas

- Loop powered only 1V drop
- Intrinsically safe ATEX & FM certification
- ±19999 display 20mm high
- Internal calibrator & root extractor

Optional:
- Loop powered backlight
- Separately powered backlight
- Alarms
- Lineariser
- Tare function

- IP66 & NEMA 4 GRP or aluminium enclosure
- 3 year guarantee

Use BA324D for new installations
SPECIFICATION

Input
Current 4 to 20mA
Voltage Less than 1V at 20°C
Less than 1.1V at -20°C
Less than 5V when loop-powered backlight is fitted
Overrange ±200mA will not cause damage.

Display
Type 4½ digit (-19999 to 19999)
Liquid crystal 20mm high
Span Adjustable between 0 & ±19999
for a 4 to 20mA input.
Zero Adjustable between -19999 & 19999 with 4mA input.
Decimal point 1 of 4 positions or absent
Zero blanking Only one leading zero is displayed
Polarity Automatic minus sign
Direction Display may increase or decrease with increasing current. Factory set option.
Reading rate 2 per second
Overrange 4 least significant digits are blanked

Push-buttons
▼ button Shows display with 4mA input
▲ button Shows display with 20mA input
P* button Displays input current in mA, or as a percentage of span. When tare or alarms are fitted has modified function. Optional external push-button allows P* button to be operated without removing front cover.

Accuracy
At 20°C Linear: ±0.02% of span ±1 digit
Root extracting: ±16µA at input ±1digit
Temperature effect on:
Zero Less than 25ppm/°C
Span Less than 50ppm/°C
Series mode rejection Less than 0.05% of span error for 1mA pk to pk 50Hz or 60Hz signal.

Intrinsic safety
Europe ATEX
Standard EN50 020-1994
Code Group II, Category 1G
Cert No EEx ia IIC T5
Output parameters
Uo 1.1V dc Complies with Clause 5.4 of EN50 020.1994
Io 70mA dc Simple ‘Apparatus’
Wo 23mW<br>Leq 10µH<br>Location Zone 0, 1 or 2
Installation The BA324C may be connected to any certified intrinsically safe circuit whose output parameters do not exceed:
Uo 30V dc
Io 200mA dc
Wo 0.8W

USA FM
Standard 3610 Entity
Code CL I, II, III: Div 1: GP A, B, C, D, E, F & G
Temperature code T4 at 60°C
File No 4B3A7.AX

Standard 3611 Nonincendive
Code CL I: Div 2: GP A, B, C & D
CL II, III: Div 2: GP F & G
File No 4B3A7.AX

Environmental
Operating temp -20 to +60°C (Certified for use at -40°C)
Storage temp -40 to +85°C
Humidity To 95% at 40°C
Enclosure IP66
EMC In accordance with EU Directive 89/336/EEC, full report available.
Immunity Less than 2% of span error for 10V/m field strength between 27MHz & 1 GHz.
Emissions Undetectable above background noise. Class B equipment

Mechanical
Terminals Screw clamp for 0.5 to 2.5mm² cables.
Weight GRP enclosure 1.1kg
Aluminium enclosure 1.4kg

Accessories
Loop powered backlight Green; powered from 4/20mA current. Voltage drop of indicator plus backlight less than 5V.
Separately powered backlight Orange; powered from 28V 300Ω Zener barrier or galvanic isolator.

TERMINAL CONNECTIONS

Alarms Two independent alarms each of which may be programmed as a high or low trip with NC or NO output.
 Outputs Isolated solid state single pole switch
 Ron less than 51Ω + 0.6V
 Roff greater than 180k
 Certification Output complies with Clause 5.4 of EN50 020.1994 ‘Simple Apparatus’.
 Tare function Primarily intended for weighing applications. Sets indicator display to zero when the ‘P’ push-button is operated.
 Lineariser Provides 16 fully adjustable straight lines which may be adjusted to compensate for almost any non-linear variable.
 External push-button Enables ‘P’ button to be operated without removing front cover.
 Etched scale plate Removable blank stainless steel plate fitted to each indicator, can be supplied etched with tagging information. See accessory datasheet for details.
 Etched tag plate Removable blank stainless steel plate fitted to each indicator, can be supplied etched with tagging information. See accessory datasheet for details.
 Pipe mounting kit 2 kits are available BA392C and BA393.
 Panel mounting kit BA394 mounts BA324C into a panel aperture.

HOW TO ORDER

Please specify:
Model number BA324C
Enclosure GRP or aluminium
Display mode Linear or root extracting*
Display at 4mA XXXX & sign if display is negative*
Display resolution 1, 2, 5 or 10 digits*
Accessories Please specify if required:
Display backlight Loop powered backlight or Separately powered backlight
Alarms Tare function Tare
Lineariser Lineariser*
External push-button Push-button
Scale card Legend
Tag strip Legend
Pipe mounting kit BA392C or BA393
Panel mounting kit BA394

TERMINAL CONNECTIONS

2 x M20 conduit entries

# See accessory datasheet for details.

DIMENSIONS (mm)

Alarms
Two independent alarms each of which may be programmed as a high or low trip with NC or NO output.

Outputs
Isolated solid state single pole switch
Ron less than 51Ω + 0.6V
Roff greater than 180k

Certification
Output complies with Clause 5.4 of EN50 020.1994 ‘Simple Apparatus’.

Tare function
Primarily intended for weighing applications. Sets indicator display to zero when the ‘P’ push-button is operated.

Lineariser
Provides 16 fully adjustable straight lines which may be adjusted to compensate for almost any non-linear variable.

External push-button
Enables ‘P’ button to be operated without removing front cover.

Etched scale plate
Removable blank stainless steel plate fitted to each indicator, can be supplied etched with tagging information. See accessory datasheet for details.

Etched tag plate
Removable blank stainless steel plate fitted to each indicator, can be supplied etched with tagging information. See accessory datasheet for details.

Pipe mounting kit
2 kits are available BA392C and BA393.

Panel mounting kit
BA394 mounts BA324C into a panel aperture.

*Will be set to display 0.00 at 4mA and 100.00 at 20mA with linear display mode and resolution of 1 digit if calibration information is not supplied.

# Contact BEKA if calibration of accessories is required.

Please specify:
Model number BA324C
Enclosure GRP or aluminium
Display mode Linear or root extracting*
Display at 4mA XXXX & sign if display is negative*
Display resolution 1, 2, 5 or 10 digits*
Accessories Please specify if required:
Display backlight Loop powered backlight or Separately powered backlight
Alarms Tare function Tare
Lineariser Lineariser*
External push-button Push-button
Scale card Legend
Tag strip Legend
Pipe mounting kit BA392C or BA393
Panel mounting kit BA394

*Will be set to display 0.00 at 4mA and 100.00 at 20mA with linear display mode and resolution of 1 digit if calibration information is not supplied.

# Contact BEKA if calibration of accessories is required.
The new BA324D is a third generation intrinsically safe field mounting indicator housed in a robust IP66 GRP enclosure incorporating a separate terminal compartment and dedicated access to the instrument controls. Retaining all the features of the popular BA324C, this new indicator provides improved display visibility, plus simplified installation, calibration and routine inspection facilities.

Like its predecessor, the BA324D displays the current flowing in a 4/20mA loop in accurate engineering units. The instrument is loop powered but only introduces a 1V drop allowing it to be installed in series with almost any 4/20mA loop.

Main application of the BA324D is to display a measured variable or control signal in a hazardous process area. The zero and span of the display are independently adjustable so that the indicator may be calibrated to display any variable represented by a 4/20mA current, such as temperature, pressure, or level. When used with a differential flow transmitter a square root extractor enables the BA324D to display flow in linear engineering units.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fixings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection which has been independently assessed by ITS - report available. A separate terminal compartment allows the instrument to be installed and terminated without exposing the display electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and the clamping screws are both forward facing. Additional terminals are provided which may be used to link the return 4/20mA conductor and the cable screen.

Calibration and programming of the instrument is performed via four push-buttons protected from damage and tampering behind a sealed cover. For applications requiring frequent adjustment, the indicator can be supplied with external membrane push-buttons. All the calibration functions are contained in easy to understand menus which may be protected by a user definable security code.

An internal calibrator simulates 4 and 20mA input currents so that the instrument may be calibrated without the need for test equipment or disconnection from the 4/20mA loop. Although not providing independent verification, it is an effective way to quickly check performance or to recalibrate.

International intrinsic safety certification allows the BA324D to be installed throughout the world. The 4/20mA input terminals comply with the requirements for simple apparatus enabling the indicator to be connected in series with most certified intrinsically safe circuits; together with the low voltage drop, this makes the instrument very easy to apply. ATEX and FM approvals permit installation in Europe and the USA, and the IECEx certification allows installation in a growing number of countries including Australia and New Zealand.

Two alternative backlight options are available. The loop powered backlight produces green background illumination enabling the display to be read at night and in poor lighting conditions. It does not require an additional power supply, IS interface or field wiring, but the indicator voltage drop is increased. The separately powered backlight provides a bright orange output to enhance daylight viewing, but it requires an additional IS interface and field wiring.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed as high or low trips with normally open or closed contacts.

Units of measurement and the instrument application or tag number can be economically marked onto the display escutcheon and the instrument may be protected from reverse connection and over-range input currents and incorporates extensive radio frequency filtering to comply with the European EMC Directive. The indicator assembly can be removed from the enclosure without disconnecting the field wiring or disturbing the 4/20mA loop, continuity being maintained by a diode within the terminal assembly.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The BA324D is protected from reverse connection and over-range input currents and incorporates extensive radio frequency filtering to comply with the European EMC Directive. The indicator assembly can be removed from the enclosure without disconnecting the field wiring or disturbing the 4/20mA loop, continuity being maintained by a diode within the terminal assembly.

BA324D
2-wire 4/20mA
4½ digit indicator
Intrinsically safe for use in gas and dust hazardous areas

◆ Loop powered only 1V drop
◆ Intrinsically safe ATEX gas or ATEX gas & dust or FM & ATEX gas
All models have IECEx certification
◆ ±19999 display 20mm high
◆ IP66 GRP enclosure with separate terminal compartment
◆ Optional: Backlight: loop or separately powered Alarms Lineariser Tare function External push-buttons
◆ 3 year guarantee

BA324D 4/20mA / 4½ digit indicator

BEKA associates Ltd. Old Charlton Rd.
Hitchin, Hertfordshire, SG5 2DA, U.K.
Tel. (01462) 438301 Fax (01462) 453971
e-mail sales@beka.co.uk www.beka.co.uk

Hazardous area
Safe area

Zener barriers or galvanic isolators

Optional alarm outputs

Optional loop powered display backlight and external push-buttons

2-wire
Tx
4/20mA

Hitchin, Hertfordshire, SG5 2DA, U.K.
Tel. (01462) 438301 Fax (01462) 453971
e-mail sales@beka.co.uk www.beka.co.uk

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SPECIFICATION

Input
Current
Voltage
Overrange

Display
Type
Zero
Span
Decimal point
Polarity
Direction
Reading rate
Over & underrange

Push-buttons
▼ button
▲ button
‘P’ button

Accuracy
At 20° C
Temp. effect
Zero
Span

Intrinsic safety
Europe ATEX
Standard
Code
Cert. No

USA FM
Standard
Code
File

International IECex
Standard
Code
Cert. No

Environmental
Operating temp
Storage temp
Humidity
Enclosure
EMC

Mechanical
Terminals
Weight

Accessories
Loop powered backlight,
Separately powered backlight,
Alarms

Output parameters
Uo
Po
Ceq
Leq

Location
Gas Zone 0, 1 or 2
Installation

Terminals
Connections

TERMINAL CONNECTIONS

H O W  T O  O R D E R

Please specify
Model number
Certification
Display at 4mA
Display at 20mA

Accessories
Please specify if required
Display backlight
Loop powered backlight or Separately powered backlight
Alarms
Tare function
Lineariser
External push-buttons

Pipe mounting kit
BA392D or BA393#

Certification
ATEX gas
ATEX gas & dust
FM & ATEX gas

All models have IECEx certification.
Note: Cable entries differ for FM & ATEX models

XXX involves position of decimal

XXX point & sign if negative *

* Will be set to display 0.00 at 4mA and 100.00 with linear display and resolution of 1 digit if calibration information is not supplied.
The BA324ND is a Type nL certified field mounting indicator housed in a robust IP66 GRP enclosure incorporating a separate terminal compartment and dedicated access to the instrument controls. Retaining all the features of earlier models, this third generation indicator provides improved display visibility, plus simplified installation and calibration.

BA324ND displays the current flowing in a 4/20mA loop in accurate engineering units. The instrument is loop powered but only introduces a 1V drop allowing it to be installed in series with almost any 4/20mA loop.

Main application of the BA324ND is to display a measured variable or control signal in a Zone 2 hazardous process area. The zero and span of the display are independently adjustable so that the indicator may be calibrated to display any variable represented by a 4/20mA current, such as temperature, pressure, or level. When used with a differential flow transmitter a square root function enables the BA324ND to display flow in linear engineering units.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection which has been independently assessed by ITS - report available. A separate terminal compartment allows the instrument to be installed and terminated without exposing the display electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and the clamping screws are both forward facing. Additional terminals are provided which may be used to link the return 4/20mA conductor and the cable screen.

Calibration and programming of the instrument is performed via four push-buttons protected from damage and tampering behind a sealed cover. For applications requiring frequent adjustment, the indicator can be supplied with a robust external membrane key-pad. All the calibration functions are contained in easy to understand menus which may be protected by a user definable security code.

An internal calibrator simulates 4 and 20mA input currents so that the instrument may be calibrated without the need for test equipment or disconnection from the 4/20mA loop. Although not providing independent verification, this is an effective way to quickly check performance or to recalibrate.

A Type nL Certificate of Conformity has been issued by ITS confirming compliance with EN50021:1999 standard for Zone 2 electrical apparatus. Based on this third party assessment, an EC Declaration of Conformity confirms that the BA324ND also complies with the requirements for Group II Category 3G equipment defined in the ATEX Directive 94/9/EC. This allows the indicator to be installed in Zone 2 hazardous areas without Zener barriers or galvanic isolators. For Zone 2 applications the BA324ND offers a less expensive alternative to intrinsic safety or flameproof instrumentation.

Two alternative backlight options are available. The loop powered backlight produces green background illumination enabling the display to be read at night and in poor lighting conditions. It does not require an additional power supply or field wiring, but the indicator voltage drop is increased. The separately powered backlight provides a bright orange output to enhance daylight viewing, but it requires an additional power supply and field wiring.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed for high or low operation with normally open or closed outputs.

Units of measurement and the instrument application or tag number can be economically marked onto the display escutcheon prior to despatch or after installation on-site. Alternatively, for customers who prefer an etched stainless steel label, the indicator can be supplied with a custom etched stainless steel legend plate mounted on the front of the instrument.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The BA324ND is protected from reverse connection and over-range input currents and incorporates extensive radio frequency filtering to comply with the European EMC Directive. The indicator assembly can be removed from the enclosure without disconnecting the field wiring or disturbing the 4/20mA loop, continously being maintained by a diode within the terminal assembly.
**SPECIFICATION**

**Input**
- Current: 4 to 20mA
- Voltage: less than 1V at 20°C
- Overrange: ±200mA will not cause damage

**Display**
- Type: Liquid crystal 20mm high
- Zero: Adjustable between ±19999 with 4mA input.
- Span: Adjustable between ±19999 for a 4 to 20mA input.
- Decimal point: 1 of 4 positions or absent
- Polarity: Automatic minus sign
- Direction: Display may increase or decrease with increasing current. Factory set option.
- Reading rate: 2 per second
- Over & underrange: 4 least significant digits are blanked

**Push-buttons**
- (In operating mode)
  - Down button: Shows display with 4mA input
  - Up button: Shows display with 20mA input
  - 'P' button: Displays input current in mA, or as a percentage of span. Has modified function when optional alarms or Tare function are fitted.

**Accuracy**
- At 20°C: Linear: ±0.02% of span ±1 digit
- Root extracting: ±16µA at input ±1 digit

**Temp. effect**
- Zero: Less than 25ppm/°C
- Span: Less than 50ppm/°C
- Series mode: Less than 0.05% of span error for 1mA pk to pk 50Hz or 60Hz signal.

**Type nL certification**
- Certificate of Conformity
  - Standard: BS EN50021:1999
  - Code: EEx nL T5
  - Cert. No: ITS No. Ex99Y4004
- EC Declaration of Conformity
  - Code: Group II, Category 3G
  - Location: Zone 2
  - Cert. No: N0010
  - Installation: The BA324ND may be connected in series with any 4/20mA circuit providing maximum current in normal operation is less than 30mA.

**Environmental**
- Operating temp: -20 to +80°C (Certified for use at -40°C)
- Storage temp: -40 to +85°C
- Humidity: To 95% at 40°C
- Enclosure: IP66
- Immunity: Less than 1% of span error for 10V/m field strength between 27MHz and 1GHz.
- Emissions: Undetectable above background noise Class B equipment

**Mechanical**
- Terminals: Screw clamps for 0.5 to 1.5mm² cables
- Weight: 1.6Kg

**Accessories**
- Loop powered backlight: Green; powered from 4/20mA current.
- Separately powered backlight: Orange; powered from 18 to 30V dc supply.
- Alarms: Two independent alarms each of which may be programmed for high or low operation with NC or NO output.
- Outputs: Isolated single pole solid state switch
  - On: less than 55Ω + 0.6V
  - Off: greater than 180kΩ
- Lineariser: Provides 16 fully adjustable straight lines which may be positioned to compensate for almost any non-linear variable.
- Tare function: Primarily intended for weighing applications. Sets indicator display to zero when 'P' push-button is operated.

**TERMINAL CONNECTIONS**

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

Please specify
- Model number: BA324ND
- Display at 4mA: XXXX
- Display at 20mA: XXXX

Include position of decimal point & sign if negative #

**Accessories**

Please specify if required
- Display backlight: Loop powered backlight or Separately powered backlight
- Alarms: Alarms
- Tare function: Tare
- Lineariser: Lineariser
- External keypad: External keypad

**Escutcheon marking**
- Scale: Scale legend
- Tag: Tag legend
- Stainless legend plate: Stainless steel plate secured to terminal cover, etched with tagging or applicational information.

*See accessory datasheet for details

Pipe mounting kit: 2 kits are available BA392D and BA393

# Will be set to display 0.00 at 4mA and 100.00 with linear display and resolution of 1 digit if calibration information is not supplied
The BA326C is an intrinsically safe loop powered indicator that displays the 4/20mA input current on both a 100 segment analogue bargraph and in accurate engineering units on a digital display.

Main application of the BA326C is to display a measured variable or control signal in a hazardous process area. For level and similar measurements the combination of an analogue and digital display provides magnitude and trend information from the bargraph, plus accurate readings in engineering units from the digital display. The relative magnitude of variables can be effectively presented by mounting BA326C indicators side by side. An optional 16 point lineariser enables the BA326C to display non linear variables in linear engineering units.

Control and calibration of the combined indicator is performed via the front panel tactile push-buttons. Using these buttons the operator can temporarily display the measured variable as a percentage of span, the input current in mA and the numerical display at 4 and 20mA input. All the calibration functions are contained in easy to understand menus which may be protected by a four digit user selectable security code.

Intrinsic safety certification to the ATEX Directive allows installation throughout Europe. The 4/20mA input terminals comply with the requirements for simple apparatus allowing the BA326C to be connected in series with most certified intrinsically safe circuits without the need for an additional system certificate. This, together with the low voltage drop, makes the BA326C very easy to apply. The optional backlight is electrically segregated from the indicator and has been certified as a separate intrinsically safe circuit which may be powered from a Zener barrier or galvanic isolator. Similarly, the two optional alarms are galvanically isolated and each is certified as a separate intrinsically safe circuit complying with the requirements for simple apparatus. FM certification permits the indicator to be installed in the USA.

The analogue bargraph which contains 100 segments, provides a rapid indication of the input current, enabling an operator to quickly assess the magnitude and trend of a process variable. The bargraph displays zero to full scale for a 4 to 20mA input, but may be calibrated to show deviation from any input current. Either a column or a single segment display may be selected and if only the analogue display is required, the digital display may be disabled.

Separately powered backlighting is available as an option. The orange output enhances daylight contrast and enables the display to be read when the instrument is installed in a poorly illuminated area.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed. For easy comparison with the 4/20mA input, both setpoints are displayed on a second bargraph with annunciators showing the alarm status. Each alarm can control a certified hazardous area load or the output may be transferred to the safe area via a Zener barrier or galvanic isolator.

The IP65 front panel is a robust, easy to clean Noryl moulding surrounding an armoured glass window. A captive neoprene gasket provides a seal between the instrument enclosure and the panel.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The BA326C is protected from reverse connection and overrange input currents, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.
**SPECIFICATION**

**Input**
- Current: 4 to 20mA
- Voltage: Less than 1V at 20°C
- Less than 1.1V at -20°C
- Overrange: ±200mA will not cause damage

**Display**
- Type: Liquid crystal
- Reading rate:
  - Analogue: 4 per second
  - Digital: 2 per second
- Analogue: 95mm long 100 segment column or single segment.
- Range: 0 to 100% for 4 to 20mA input
- Digital: Adjustable between 0 & ±19999
- Decimal point: 1 of 5 positions or absent
- Polarity: Automatic minus sign
- Direction: Display may increase or decrease with increasing current.
- Over & underrange: 4 least significant digits are blanked

**Push-buttons**
- (Function in operating mode)
  - ▲ button: Shows display with 4mA input
  - ▼ button: Shows display with 20mA input
  - ‘P’ button: Displays input current in mA, or as a percentage of span.

**Accuracy at 20°C**
- Analogue: ±0.5%
- Digital: ±0.02% ±1 digit
- Root extracting: 16µA at input ±1 digit
- Temp. effect:
  - Analogue: ±0.5% between -20 & 60°C
  - Digital: ±0.05% ±50ppm/°C
- Zero: Less than 25ppm/°C
- Span: Less than 50ppm/°C
- Series mode: Less than 0.5% error for 1mA pk to pk 50Hz or 60Hz signal.

**Intrinsic safety**
- Europe ATEX
  - Standard: EN50020:1994
  - Code: Group II Category 1 G EEx ia IIC T5
  - Cert. No: ITS99ATEX2009

**USA FM**
- Standard: 3610 Entity
  - CODE: CL I: Div 1: GP A, B, C & D, T4 @ 60°C
  - Standard: 3611 Nonincendive
    - Code: CL I: Div 2: GP A, B, C & D, T4 @ 60°C
    - File: 3008833-1

**Environmental**
- Operating temp: -20 to +60°C (Certified for use at -40°C)
- Storage temp: -40 to +85°C
- Humidity: To 95% at 40°C non-condensing

**Mechanical**
- Terminals: Blue removable terminal block for 0.5 to 1.5mm² cables
- Weight: 0.5kg

**Accessories**
- Separately powered backlight
- Alarms: LED backlight powered from 28V 300Ω Zener barrier or galvanic isolator.

**Outputs**
- Isolated single pole solid state switch:
  - Ron: less than 5kΩ +0.6V
  - Roff: greater than 180kΩ
- Certification: Both outputs comply with Clause 5.4 of EN50020:1995 Simple Apparatus.
- Lineariser: Provides 16 fully adjustable straight lines which may be positioned to compensate for almost any non-linear variable.
- Typeset scale card: Blank scale card fitted to each indicator can be supplied typeset with units of measurement.
- Bargraph scale: Blank scale fitted to each indicator can be supplied typeset with analogue scale.
- Tag number: Thermally printed number on rear of the instrument.

**HOW TO ORDER**
- Model number: BA326C
- Display mode:
  - Digital display: Linear or root extracting*
  - at 4mA
  - at 20mA
- Digital display: XXXX Include position of decimal point, dummy zero if required & sign if negative
- Accessories:
  - Display backlight: Separately powered backlight
  - Alarms: Alarms#
  - Lineariser: Lineariser#
  - Scale card: Required scale graduations
  - Tag number: Legend

*Will be set to display 0.00 at 4mA and 100.00 at 20mA with a linear display if calibration information is not supplied.

#Contact BEKA if calibration of accessories is required.
The BA327C is an intrinsically safe 4½ digit panel mounting indicator which displays the current flowing in a 4/20mA loop in meaningful engineering units. The instrument is loop powered, but only introduces a 1V drop allowing it to be installed in series with almost any 4/20mA loop.

**Main application** of the BA327C is to display a measured variable or control signal in a hazardous process area. The zero and span of the display are independently adjustable so that the indicator can easily be calibrated on-site to display any linear or square law signal represented by a 4/20mA current, such as temperature, flow or pressure. An optional 16 point lineariser enables the BA327C to display non linear variables in linear engineering units, and two optional alarms can control hazardous or safe area loads.

**Control and calibration** of the indicator is performed via the front panel tactile push-buttons which ‘click’ when operated. Using the push-buttons the operator can temporarily select the measured variable as a percentage of span, the input current in mA and the calibration at 4 & 20mA. The calibration functions are contained in easy to understand menus which are protected by a four digit user selectable security code.

**Two backlight** options are available. The loop powered backlight produces green background illumination enabling the display to be read at night and in poor lighting conditions. No additional power supply, IS interface or field wiring are required, but the indicator voltage drop is increased. Alternatively, the separately powered backlight has a bright orange output which enhances daylight viewing, but an additional IS interface and field wiring are required.

**Optional alarms** provide two galvanically isolated solid state outputs which may be independently programmed as high or low trips with normally open or closed contacts.

**International intrinsic safety certification** allows the BA327C to be installed throughout the world. The 4/20mA input terminals comply with the requirements for simple apparatus enabling the indicator to be connected in series with most certified intrinsically safe circuits which, together with the low voltage drop, make the instrument very easy to apply. ATEX and FM approvals permit installation in Europe and the USA and the IECEx certification allows installation in a growing number of countries including Australia and New Zealand. Selection of Zener barriers and galvanic isolators is described in Application Guide AG300.

The front panel is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. A captive neoprene gasket provides an IP65 seal between the enclosure and the panel.

**Reliability** is ensured by an ISO9001 approved quality control system backed by a three year guarantee. The indicator is protected from reverse connection and overrange input current, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.
**SPECIFICATION**

**Input**
- Current: 4 to 20mA
- Voltage: Less than 1V at 20˚C
- Less than 1.1V at -20˚C
- Less than 5V when loop-powered backlight is fitted

**Overrange**: 200mA will not cause damage.

**Display**
- Type: 4½ digit (-19999 to 19999)
- Liquid crystal 10mm high
- Span: Adjustable between 0 & ±19999 for a 4 to 20mA input.
- Zero: Adjustable between -19999 & 19999 with 4mA input.
- Decimal point: 1 of 4 positions or absent
- Zero blanking: Only one leading zero is displayed
- Polarity: Automatic minus sign
- Direction: Display may increase or decrease with increasing current.
- Reading rate: 2 per second
- Overrange: 4 least significant digits are blanked

**Push-buttons**
- ▲ button: Shows display with 4mA input
- ▼ button: Shows display with 20mA input
- ‘P’ button: Displays input current in mA, or as a percentage of span. When tare or alarms are fitted has modified function.

**Accuracy**
- At 20˚C: Linear: ±0.02% ±1 digit
- Root extracting: ±16µA at input ±1 digit

**Temperature effect on:**
- Zero: Less than 25ppm/˚C
- Span: Less than 50ppm/˚C
- Series mode rejection: Less than 0.05% of span error for 1mA pk to pk 50Hz or 60Hz signal

**Intrinsic safety**
- **Europe ATEX**
  - Standard: EN50 020:1994
  - Code: Group II, Category 1G
  - Cert No: Ex ia IIC T5
  - EN50 020:1994
- **Output parameters**
  - Uo: 1.1V dc
  - Io: 70mA dc
  - Wo: 23mW
  - Ceq: 20nF
  - Leq: 10μH
- **Location**: Zone 0, 1 or 2

**USA FM**
- Standard: 3610 Entity
- Code: CL I: Div 1: GP A, B, C, D
- Temperature code: T4 at 60˚C
- File No: 4B3A7.AX

**International IECEx**
- Standard: IEC60079-11:1999
- Code: Ex ia IIC T5
- Cert. No: IECEx ITS 05.0003

**Environmental**
- Operating temp: -20 to +60˚C (certified for use at -40˚C)
- Storage temp: -40 to +85˚C
- Humidity: 95% at 40˚C non-condensing
- Immunity: Less than 1% of span error for 10V/m field strength between 27MHz & 1GHz.
- Emissions: Undetectable above background noise.

**Mechanical**
- Terminals: Screw clamp for 0.5 to 1.5mm² cables in blue removable terminal block
- Weight: 0.3kg

**Accessories**
- Loop powered backlight: Green; powered from 4/20mA current. Voltage drop of indicator plus backlight less than 5V.
- Separately powered backlight: Orange; powered from 28V 300Ω Zener barrier or galvanic isolator.
- Two independent alarms each of which may be programmed as a high or low trip with NC or NO output.

**TERMINAL CONNECTIONS**

**Outputs**
- Isolated solid state switch
- Ron: less than 511 + 0.6V
- Roff: greater than 180kΩ

**Tare function**
- Primarily intended for weighing applications. Sets indicator display to zero when the ‘P’ push-button is operated.

**Lineariser**
- Provides 16 fully adjustable straight lines which may be adjusted to compensate for almost any non-linear variable.

**Typeset scale card**
- Blank scale card fitted to each indicator can be supplied typeset with units of measurement.

**Tag number**
- Thermally printed number on the rear of the instrument.

**HOW TO ORDER**

**Please specify:**
- Model number: BA327C
- Display mode: Linear or root extracting
- Display at 4mA: XXXX
- Include position of decimal point & sign if negative

**Accessories**
- Please specify if required:
  - Display backlight:
    - Loop powered backlight or
    - Separately powered backlight
  - Alarms:
    - Lineariser
    - Tare function: Tare
    - Scale card: Legend
    - Tag number: Legend

**Contact BEKA if calibration of accessories is required.**
The BA328C is an intrinsically safe 4½ digit panel mounting indicator which displays the current flowing in a 4/20mA loop in meaningful engineering units. The instrument is loop powered, but only introduces a 1V drop allowing it to be installed in series with almost any 4/20mA loop.

Main application of the BA328C is to display a measured variable or control signal in a hazardous process area. The zero and span of the display are independently adjustable so that the indicator can easily be calibrated on-site to display any linear or square law signal represented by a 4/20mA current, such as temperature, flow or pressure. An optional 16 point lineariser enables the BA328C to display non linear variables in linear engineering units, and two optional alarms can control hazardous or safe area loads.

Control and calibration of the indicator is performed via the front panel tactile push-buttons which ‘click’ when operated. Using the push-buttons the operator can temporarily select the measured variable as a percentage of span, the input current in mA and the calibration at 4 & 20mA. The calibration functions are contained in easy to understand menus which are protected by a four digit user selectable security code.

Two backlight options are available. The loop powered backlight produces green background illumination enabling the display to be read at night and in poor lighting conditions. No additional power supply, IS interface or field wiring are required, but the indicator voltage drop is increased. Alternatively, the separately powered backlight has a bright orange output which enhances daylight viewing, but an additional IS interface and field wiring are required.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed as high or low trips with normally open or closed contacts.

International intrinsic safety certification allows the BA328C to be installed throughout the world. The 4/20mA input terminals comply with the requirements for simple apparatus enabling the indicator to be connected in series with most certified intrinsically safe circuits which, together with the low voltage drop, make the instrument very easy to apply. ATEX and FM approvals permit installation in Europe and the USA and the IECEx certification allows installation in a growing number of countries including Australia and New Zealand. Selection of Zener barriers and galvanic isolators is described in Application Guide AG300.

The front panel is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. A captive neoprene gasket provides an IP65 seal between the enclosure and the panel.

Reliability is ensured by an ISO9001 approved quality control system backed by a three year guarantee. The indicator is protected from reverse connection and overrange input current, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.
**SPECIFICATION**

**Input**
- Current: 4 to 20mA
- Voltage: Less than 1V at 20°C
  - Less than 1.1V at -20°C
  - Less than 5V when loop-powered backlight is fitted
- Overrange: 200mA will not cause damage.

**Display**
- Type: 4½ digit (-19999 to 19999)
- Liquid crystal 20mm high
- Span: Adjustable between 0 & ±19999 for a 4 to 20mA input.
- Zero: Adjustable between -19999 & 19999 with 4mA input.
- Decimal point: 1 of 4 positions or absent
- Zero blanking: Only one leading zero is displayed
- Automatic minus sign
- Direction: Display may increase or decrease with increasing current.
- Reading rate: 2 per second
- Overrange: 2 least significant digits are blanked

**Push-buttons**
- (Function in operating mode)
  - ▼ button: Shows display with 4mA input
  - ▲ button: Shows display with 20mA input
  - 'P' button: Displays input current in mA, or as a percentage of span. When tare or alarms are fitted has modified function.

**Accuracy**
- At 20°C: Linear: ±0.02% ±1 digit
- Root extracting: ±16µA at input ±1 digit
- Temperature effect on:
  - Zero: Less than 25ppm/°C
  - Span: Less than 50ppm/°C
  - Series mode rejection: Less than 0.05% of span error for 1mA pk to pk 50Hz or 60Hz signal

**Intrinsic safety**
- Europe ATEX
  - Standard: EN50 020:1994
  - Code: Group II, Category 1G
  - EEx ia IIC T5
  - Cert No: ITS02ATEX2028

**Output parameters**
- Uo: 1.1V dc
- Io: 70mA dc
- Wo: 23mW
- Ceq: 20nF
- Leq: 10µH
- Location: Zone 0, 1 or 2
- Installation: The BA328C may be connected to any certified intrinsically safe circuit whose output parameters do not exceed:
  - Uo: 30V dc
  - Io: 200mA dc
  - Wo: 0.8W

**USA FM**
- Standard: 3610 Entity
  - Code: CL I: Div 1: GP A, B, C, D
  - Temperature code: T4 at 60°C
  - File No: 4B3A7.AX
- Standard: 3611 Nonincendive
  - Code: CL I: Div 2: GP A, B, C & D
  - File No: 4B3A7.AX

**International IECEx**
- Standard: IEC60079-11:1999
  - Code: Ex ia IIC T5
  - Cert No: IECEx ITS 05.0003

**Environmental**
- Operating temp: -20 to +60°C (certified for use at -40°C)
- Storage temp: -40 to +85°C
- Humidity: To 95% at 40°C non-condensing
- Enclosure: Front IP65 Rear IP20
- Immunity: Less than 1% of span error for 10V/m field strength between 27MHz & 1GHz
- Emissions: Undetectable above background noise.

**Mechanical**
- Terminals: Blue screw clamp for 0.5 to 1.5mm² cables. Terminal block removable.
- Weight: 0.5kg

**Accessories**
- Loop powered backlight: Green; powered from 4/20mA current. Voltage drop of indicator plus backlight less than 5V.
- Separately powered backlight: Orange; powered from 28V 300Ω Zener barrier or galvanic isolator.
- Alarms: Two independent outputs each of which may be programmed as a high or low trip with NC or NO output.

**Recommended panel cut-out**
- DIN 43 700
  - 138.0 +1.0/-0.0 x 68.0 +0.7/-0.0
  - To achieve an IP65 seal between the instrument and the panel
  - 138.0 +0.5/-0.0 x 66.2 +0.5/-0.0

**Outputs**
- Isolated solid state switch
  - Ron: less than 51Ω + 0.6V
  - Roff: greater than 180k
  - Certification: Output complies with Clause 5.4 of EN50 020:1994 ‘Simple Apparatus’

**Tare function**
- Primarily intended for weighing applications, sets indicator display to zero when the ‘P’ push-button is operated.

**Lineariser**
- Provides 16 fully adjustable straight lines which may be adjusted to compensate for almost any non-linear variable.

**Typeset scale card**
- Blank scale card fitted to each indicator can be supplied typeset with units of measurement.

**Tag number**
- Thermally printed number on the rear of the instrument.

**Front cover**
- BA398 provides additional mechanical protection: front panel switches can not be operated.

**TERMINAL CONNECTIONS**

**How to order**
- Please specify:
  - Model number: BA328C
  - Display mode: Linear or root extracting*
  - Display at 4mA: XXXX
  - Include position of decimal
  - Alarm 1: Optional alarm terminals
  - Alarm 2: Terminals for optional backlight

  
<table>
<thead>
<tr>
<th>Outputs</th>
<th>Isolated solid state switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ron</td>
<td>less than 51Ω + 0.6V</td>
</tr>
<tr>
<td>Roff</td>
<td>greater than 180k</td>
</tr>
</tbody>
</table>

**Accessories**
- Please specify if required:

  - Display backlight: Loop powered backlight or Separately powered backlight
  - Alarms: Lineariser #
  - Lineariser: Lineariser#
  - Tare function: Tare
  - Scale card: Legend
  - Tag number: Legend

*Will be set to display 0.00 at 4mA and 100.00 at 20mA with linear display if calibration information is not supplied.
# Contact BEKA if calibration of accessories is required.
The new BA504D is a third generation, general purpose field mounting indicator housed in a robust IP66 GRP enclosure incorporating a separate terminal compartment and dedicated access to the instrument controls. Retaining all the features of the popular BA504C, this new indicator provides improved display visibility, plus simplified installation, calibration and routine inspection facilities.

Like its predecessor, the BA504D displays the current flowing in a 4/20mA loop in accurate engineering units. The instrument is loop powered but only introduces a 1V drop allowing it to be installed in series with almost any 4/20mA loop.

Main application of the BA504D is to display a measured variable or control signal in a process area. The zero and span of the display are independently adjustable so that the indicator can be calibrated to display any variable represented by a 4/20mA current, such as temperature, pressure, level or actuator position. When used with a differential flow transmitter an optional square root extractor enables the BA504D to display flow in linear engineering units.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection which has been independently assessed by ITS - report available. A separate terminal compartment allows the instrument to be installed and terminated without exposing the display electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and the clamping screws are both forward facing. Additional terminals are provided which may be used to link the return 4/20mA conductor and the cable screens. A separate sealed cover provides access to the plug-in calibration links and potentiometers without exposing the display electronics or field terminals.

Separately powered backlighting is available as an option. The orange output enhances daylight contrast and enables the display to be read when the instrument is installed in a poorly illuminated area.

An optional internal calibrator simulates a 4 and 20mA input current so that the indicator may be recalibrated without the need for test equipment or disconnection from the 4/20mA loop. Although not providing independent verification, it is an effective way to quickly check performance or to recalibrate.

Units of measurement and the instrument application or tag number can be economically marked onto the display escutcheon prior to despatch or after installation on-site. Alternatively, for customers who prefer an etched stainless steel label, the indicator can be supplied with a custom etched stainless steel legend plate mounted on the terminal cover.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The BA504D is protected from reverse connection and overrange input currents and incorporates extensive radio frequency filtering to comply with the European EMC Directive. The indicator assembly can be removed from the enclosure without disconnecting the field wiring or disturbing the 4/20mA loop, continuity being maintained by a diode within the terminal assembly.

If flammable atmospheres are present either the BA304D or BA304ND should be used. Both have the same features as the BA504D, and have been certified for use in hazardous areas.

BA504D
2-wire 4/20mA
3½ digit indicator
General purpose

- Loop powered
  only 1V drop
- ±1999 display
  25.4mm high
- IP66 GRP enclosure
  with separate terminal compartment
- Optional:
  Display backlight
  Root extractor
  Calibrator
- 3 year guarantee
### SPECIFICATION

**Input**
- Current: 4 to 20mA
- Voltage: Less than 1V at 20°C
  - Less than 1.1V at -20°C
- Overrange: ±200mA will not cause damage

**Display**
- Type: Liquid crystal 25.4mm high 3½ digit (-1999 to 1999)
- Zero: Adjustable between ±1000 with 4mA input.
- Span: Adjustable between 0 & 1999 for a 4 to 20mA input.
- Decimal point: 1 of 3 positions or absent
- Direction: Display may increase or decrease with increasing current. Factory set option.
- Over & underrange: Display may increase or decrease with increasing current. Factory set option.

**Display**
- Accuracy
  - At 20°C: ± 1 digit
  - Temp. effect:
    - Zero: Typ ±0.05 digit ± 100ppm/°C
    - Max: ±0.1 digit ± 200ppm/°C
  - Span: Typ ±50ppm°C: Max ±100ppm°C
- Series mode: Typ 1 digit error for 1mA pk to pk 50Hz or 60Hz signal.

**Environmental**
- Operating temp: -20 to +60°C
- Storage temp: -40 to +85°C
- Humidity: To 95% at 40°C
- Enclosure: IP66 see ITS report 87IV0383A
- Immunity: Less than 1% of span error for 10V/m field strength between 27MHz and 1GHz.
- Emissions: Undetectable above background noise Class B equipment.

**Mechanical**
- Terminals: Screw clamps for 0.5 to 1.5mm² cables
- Weight: 1.6kg

**Accessories**
- Display backlight: LED backlight
- VIN: 18 to 30V dc, may be dimmed by reducing voltage below 18V.
- LIN: 40mA typical
- Root extractor:
  - Accuracy: ±16µA at input ±1 digit for inputs between 4.16 and 20mA (10 to 100% flow).
  - Clip-off: Selectable by plug-in link. Operates at 4.04mA (5% flow).
  - Not available with calibrator
- Calibrator:
  - Simulates 4 and 20mA input, selected by plug-in link.
  - Not available with root extractor
- Scale legend:
  - Units of measurement marked on display escutcheon.
- Tag legend:
  - Tag number or applicational information marked on display escutcheon.
- Stainless legend plate:
  - Stainless steel plate secured to terminal cover, etched with tagging or applicational information.*
- Pipe mounting kit: 2 kits are available BA392D and BA393 *

* See accessory datasheet for details

### DIMENSIONS (mm)

<table>
<thead>
<tr>
<th>Model number</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA504D</td>
<td></td>
</tr>
</tbody>
</table>

**Display at 4mA**
- XXXX: Include position of decimal point & sign if negative #

**Display at 20mA**
- XXXX: Include position of decimal point & sign if negative #

**Accessories**
- Please specify if required

**Display backlight**
- Separately powered backlight

**Root extractor**
- Only one may be fitted

**Calibrator**
- Escutcheon marking

**Scale**
- Scale legend

**Tag**
- Tag legend

**Stainless legend plate**
- Pipe mounting kit: BA392D or BA393

* Will be set to display 00.0 at 4mA and 100.0 at 20mA if calibration information is not supplied.

### TERMINAL CONNECTIONS

| Terminals 2 & 4 internally linked for joining return 4/20mA wire. |
| Terminal connections |
| Terminals 5 & 6 internally linked for joining cable screens. |

**HOW TO ORDER**
The BA507C is a general purpose panel mounting indicator which displays the current flowing in a 4/20mA loop in meaningful engineering units. The instrument is loop powered, but only introduces a 1V drop allowing it to be used in series with almost any 4/20mA loop. Modular accessories enable only the required features to be selected thus reducing cost while retaining interchangeability between instruments.

Main application of the BA507C is to display a measured variable or control signal in a process area. The zero and span of the display are independently adjustable so that the indicator can be calibrated to display any linear variable represented by a 4/20mA current, such as temperature, pressure, level or actuator position. When used with a differential flow transmitter, an optional square root extractor allows the BA507C to display flow in linear engineering units.

Separately powered backlighting is available as an option. The orange output enhances daylight contrast and enables the display to be read when the instrument is installed in a poorly illuminated area.

An optional internal calibrator simulates 4 and 20mA input currents enabling the indicator to be recalibrated without the need for test equipment or disconnection from the 4/20mA loop. Although not providing independent verification, it is an effective way to check performance or to recalibrate.

The front panel is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. A captive neoprene gasket provides an IP65 seal between instrument enclosure and the panel.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The indicator is protected from reverse connection and overrange input current, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.

If flammable atmospheres are present the BA307C indicator should be used. This has the same features as the BA507C, but has been certified for use in hazardous areas.
### SPECIFICATION

<table>
<thead>
<tr>
<th>Input</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>4 to 20mA</td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>Less than 1V at 20°C</td>
<td>Less than 1.1V at -20°C</td>
</tr>
<tr>
<td>Overrange</td>
<td>±200mA will not cause damage</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Display</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>3½ digit (-1999 to 1999)</td>
<td>Liquid crystal 12.7mm high with optional backlighting.</td>
</tr>
<tr>
<td>Span</td>
<td>Adjustable between 000 &amp; 1999 for a 4 to 20mA input.</td>
<td></td>
</tr>
<tr>
<td>Zero</td>
<td>Adjustable between ±1000 with 4mA input.</td>
<td></td>
</tr>
<tr>
<td>Decimal point</td>
<td>1 of 3 positions or absent</td>
<td></td>
</tr>
<tr>
<td>Polarity</td>
<td>Automatic minus sign</td>
<td></td>
</tr>
<tr>
<td>Direction</td>
<td>Display may increase or decrease with increasing current. Factory set option.</td>
<td></td>
</tr>
<tr>
<td>Reading rate</td>
<td>2.5 per second</td>
<td></td>
</tr>
<tr>
<td>Overrange</td>
<td>3 least significant digits are blanked</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accuracy</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>At 20°C</td>
<td>±1 digit</td>
<td></td>
</tr>
<tr>
<td>Temperature effect on:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zero</td>
<td>Typ ±0.05 digit ±100ppm/°C</td>
<td>Max ±0.1 digit ±200ppm/°C</td>
</tr>
<tr>
<td>Span</td>
<td>Typ ±50ppm; max ±100ppm/°C</td>
<td>Typ 1 digit error for 1mA pk to pk 50Hz signal.</td>
</tr>
<tr>
<td>Series mode rejection</td>
<td>Typ 1 digit error for 1mA pk to pk 50Hz signal.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temp</td>
<td>-20 to +60°C</td>
<td></td>
</tr>
<tr>
<td>Storage temp</td>
<td>-40 to +85°C</td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>To 95% at 40°C non-condensing</td>
<td></td>
</tr>
<tr>
<td>Enclosure</td>
<td>Front IP65; Rear IP20</td>
<td></td>
</tr>
<tr>
<td>EMC</td>
<td>In accordance with EU Directive 89/336/EEC, full report available.</td>
<td></td>
</tr>
<tr>
<td>Immunity</td>
<td>Less than 1% of span error for 10V/m field strength between 27MHz &amp; 1 GHz.</td>
<td></td>
</tr>
<tr>
<td>Emissions</td>
<td>Undetectable above background noise. Class B equipment</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mechanical</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminals</td>
<td>Screw clamp for 0.5 to 1.5mm² cables in removable terminal block.</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>0.3kg</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessories</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Separately powered backlight</td>
<td>LED backlight</td>
<td></td>
</tr>
<tr>
<td>Vin</td>
<td>14 to 30V dc, may be dimmed by reducing voltage below 14V.</td>
<td></td>
</tr>
<tr>
<td>lin</td>
<td>40mA typical</td>
<td></td>
</tr>
<tr>
<td>Root extractor</td>
<td>±16µA at input ±1 digit for inputs between 4.16 and 20mA (10 to 100% of flow)</td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td>Selectable by internal plug-in link, operates at 4.04mA input (5% of flow) Not available with calibrator</td>
<td></td>
</tr>
<tr>
<td>Clip-off</td>
<td>Selectable by internal plug-in link, operates at 4.04mA input (5% of flow) Not available with root extractor</td>
<td></td>
</tr>
<tr>
<td>Calibrator</td>
<td>Simulates 4 and 20mA input, selected by plug-in link accessible through rear panel. Not available with root extractor</td>
<td></td>
</tr>
<tr>
<td>Typeset scale card</td>
<td>Blank scale card fitted to each indicator can be supplied typeset with units of measurement.</td>
<td></td>
</tr>
<tr>
<td>Tag number</td>
<td>Thermally printed tag number on the rear of the instrument.</td>
<td></td>
</tr>
</tbody>
</table>

### DIMENSIONS (mm)

**Recommended panel cut-out**

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN 43 700</td>
<td>92.0 +0.8/-0.0 x 45 +0.6/-0.0</td>
</tr>
</tbody>
</table>

To achieve an IP65 seal between the instrument and the panel

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 +0.5/-0.0 x 43.5 +0.5/-0.0</td>
<td></td>
</tr>
</tbody>
</table>

**Panel cut-out**

**Terminals for optional backlight are shown in outline**

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

**Please specify**

- Model number: BA507C
- Display at 4mA XXXX include position of decimal point
- At 20mA XXXX & sign if display is negative*

**Accessories**

- Display backlight
- Root extractor or Calibrator
- Scale card
- Tag number

**Please specify if required**

- Separately powered backlight
- Root extractor only one can be fitted
- Calibrator Legend
- Calibrator Legend

**Typeset scale card**

- Blank scale card fitted to each indicator can be supplied typeset with units of measurement.

- Thermally printed tag number on the rear of the instrument.

*Will be set to display 00.0 at 4mA and 100.0 at 20mA if calibration information is not supplied.
The BA508C is a general purpose panel mounting indicator which displays the current flowing in a 4/20mA loop in meaningful engineering units. The instrument is loop powered, but only introduces a 1V drop allowing it to be used in series with almost any 4/20mA loop. Modular accessories enable only the required features to be selected thus reducing cost while retaining interchangeability between instruments.

**Main application** of the BA508C is to display a measured variable or control signal in a process area. The zero and span of the display are independently adjustable so that the indicator can be calibrated to display any linear variable represented by a 4/20mA current, such as temperature, pressure, level or actuator position. When used with a differential flow transmitter, an optional square root extractor allows the BA508C to display flow in linear engineering units.

**Separately powered backlighting** is available as an option. The orange output enhances daylight contrast and enables the display to be read when the instrument is installed in a poorly illuminated area.

An optional internal calibrator simulates 4 and 20mA input currents and enables the indicator to be recalibrated without the need for test equipment or disconnection from the 4/20mA loop. Although not providing independent verification, it is an effective way to check performance or to recalibrate.

The **front panel** is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. A captive neoprene gasket provides an IP65 seal between the instrument enclosure and the panel.

**Reliability is ensured** by an ISO9001 approved quality control system supported by a three year guarantee. The indicator is protected from reverse connection and overrange input current, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.

If flammable atmospheres are present the BA308C indicator should be used. This has the same features as the BA508C, but has been certified for use in hazardous areas.
**SPECIFICATION**

**Input**
- Current: 4 to 20mA
- Voltage: Less than 1V at 20°C
- Overrange: ±200mA will not cause damage

**Display**
- Type: 3½ digit (-1999 to 1999)
- Liquid crystal 25.4mm high
- Span: Adjustable between 000 & 1999 for a 4 to 20mA input.
- Zero: Adjustable between ±1000 with 4mA input.
- Decimal point: 1 of 3 positions or absent
- Polarity: Automatic minus sign
- Direction: Display may increase or decrease with increasing current. Factory set option.
- Reading rate: 2.5 per second
- Overrange: 3 least significant digits are blanked

**Accuracy**
- At 20°C: ±1 digit
- Temperature effect on:
  - Zero: Typ ±0.05 digit ±100ppm/˚C
  - Max ±0.1 digit ±200ppm/˚C
- Span: Typ ±50ppm; max ±100ppm/˚C

**Environmental**
- Operating temp: -20 to +60˚C
- Storage temp: -40 to +85˚C
- Humidity: To 95% at 40˚C non-condensing
- Enclosure: Front IP65; Rear IP20
- Immunity: Less than 1% of span error for 10V/m field strength between 27MHz & 1 GHz.
- Emissions: Undetectable above background noise. Class B equipment

**Mechanical**
- Terminals: Screw clamp for 0.5 to 1.5mm² cables in removable terminal block.
- Weight: 0.5kg

**Accessories**
- Separately powered backlight: LED backlight, may be dimmed by reducing voltage below 18V.
- Vin: 18 to 30V dc, typical
- In: 20mA typical
- Root extractor: Accuracy ±16µA at input ±1 digit for inputs between 4.16 and 20mA (10 to 100% of flow)
- Clip-off: Selectable by internal plug-in link, operates at 4.04mA input (5% of flow)
- Not available with calibrator

**Calibrator**
- Simulates 4 and 20mA input, selected by plug-in link accessible through rear panel.
- Not available with root extractor

**Typeset scale card**
- Blank scale card fitted to each indicator can be supplied typeset with units of measurement.

**Tag number**
- Thermally printed tag number on the rear of the instrument.

**Front cover**
- BA398 provides additional mechanical protection.

**DIMENSIONS (mm)**

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

Please specify:
- Model number: BA508C
- Display at 4mA to 20mA
- Accessories:
  - Display backlight
  - Root extractor
  - Only one can be fitted
  - Calibrator
- Tag number
- Front cover
- BA398

**Legend**
- **Vin**
- **In**
- **1234**
- **4/20mA**
- **+**
- **Panel cut-out**
- **Recommended panel cut-out**

*Will be set to display 00.0 at 4mA and 100.0 at 20mA if calibration information is not supplied.*
The new BA524D is a third generation, general purpose field mounting indicator housed in a robust IP66 GRP enclosure incorporating a separate terminal compartment and dedicated access to the instrument controls. Retaining all the features of the popular BA524C, this new indicator provides improved display visibility, plus simplified installation, calibration and routine inspection facilities.

Like its predecessor, the BA524D displays the current flowing in a 4/20mA loop in accurate engineering units. The instrument is loop powered but only introduces a 1V drop allowing it to be installed in series with almost any 4/20mA loop.

Main application of the BA524D is to display a measured variable or control signal in a process area. The zero and span of the display are independently adjustable so that the indicator may be calibrated to display any variable represented by a 4/20mA current, such as temperature, pressure or level. When used with a differential flow transmitter a square root extractor enables the BA524D to display flow in linear engineering units.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection which has been independently assessed by ITS - report available. A separate terminal compartment allows the instrument to be installed and terminated without exposing the display electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and the clamping screws are both forward facing. Additional terminals are provided which may be used to link the return 4/20mA conductor and the cable screen.

Calibration and programming of the instrument is performed via four push-buttons protected from damage and tampering behind a sealed cover. For applications requiring frequent adjustment, the indicator can be supplied with a robust external membrane key-pad. All the calibration functions are contained in easy to understand menus which may be protected by a user definable security code.

An internal calibrator simulates 4 and 20mA input currents so that the instrument may be calibrated without the need for test equipment or disconnection from the 4/20mA loop. Although not providing independent verification, it is an effective way to quickly check performance or to recalibrate.

Separately powered back lighting is available as an option. The orange output enhances daylight contrast and enables the display to be read when the instrument is installed in a poorly illuminated area.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed for high or low operation with normally open or closed outputs.

Units of measurement and the instrument application or tag number can be economically marked onto the display escutcheon prior to despatch or after installation on-site. Alternatively, for customers who prefer an etched stainless steel label, the indicator can be supplied with a custom etched stainless steel legend plate mounted onto the terminal cover.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The BA524D is protected from reverse connection and overrange input currents and incorporates extensive radio frequency filtering to comply with the European EMC Directive. The indicator assembly may be removed from the enclosure without disconnecting the field wiring or disturbing the 4/20mA loop, continuity being maintained by a diode within the terminal assembly.

If flammable atmospheres are present either the BA324D or the BA324ND should be used. Both have the same features as the BA524D, and have been certified for use in hazardous areas.
**SPECIFICATION**

**Input**
- Current: 4 to 20mA
- Voltage: Less than 1V at 20˚C
- Less than 1.1V at -20˚C
- Overrange: ±200mA will not cause damage

**Display**
- Type: Liquid crystal 20mm high
- 4½ digit (-19999 to 19999)
- Zero: Adjustable between ±19999 with 4mA input.
- Span: Adjustable between ±19999 for a 4 to 20mA input.
- Decimal point: 1 of 4 positions or absent
- Polarity: Automatic minus sign
- Direction: Display may increase or decrease with increasing current.
- Reading rate: 2 per second
- Over & underrange: 4 least significant digits are blanked

**Push-buttons**
- (In operating mode)
  - Down button: Shows display with 4mA input
  - Up button: Shows display with 20mA input
  - ‘P’ button: Displays input current in mA, or as a percentage of span. Has modified function when optional alarms or Tare function are fitted.

**Accuracy**
- At 20˚C: Linear: ±0.02% of span ±1 digit
- Root extracting: ±16µA at input ±1 digit
- Temp. effect: Zero: Less than 25ppm/˚C
- Span: Less than 50ppm/˚C
- Series mode: Less than 0.05% of span error for 1mA pk to pk 50Hz or 60Hz signal.

**Environmental**
- Operating temp: -20 to +60˚C
- Storage temp: -40 to +85˚C
- Humidity: To 95% at 40˚C
- Enclosure: IP66 see ITS test report 87IV0383A
- Immunity: Less than 1% of span error for 10V/m field strength between 27MHz and 1GHz.
- Emissions: Undetectable above background noise Class B equipment.

**Mechanical**
- Terminals: Screw clamps for 0.5 to 1.5mm² cables
- Weight: 1.6kg
- Accessories: Separately powered backlight
  - Vin: 18 to 30V dc, may be dimmed by reducing voltage below 18V.
  - Lin: 40mA typical

**Alarms**
- Two independent alarms each of which may be programmed for high or low operation with NC or NO output.

**Outputs**
- Isolated single pole solid state switch
  - Ron: less than 5Ω + 0.6V
  - Roff: greater than 180k
- Lineariser: Provides 16 fully adjustable straight lines which may be positioned to compensate for almost any non-linear variable.

**Tare function**
- Primarily intended for weighing applications.
  - Sets indicator display to zero when ‘P’ push-button is operated.

**External keypad**
- Robust membrane keypad enables indicator to be controlled without removing control cover.

**Scale legend**
- Units of measurement marked onto display escutcheon.
  - Tag legend: Tag number or applicational information marked onto display escutcheon.
  - Stainless legend plate: Stainless steel plate secured to terminal cover, etched with tagging or applicational information.
  - Pipe mounting kit: BA392D or BA393

**Pipe mounting kits**
- 2 kits available BA392D and BA393
- # Will be set to display 0.00 at 4mA and 100.00 with linear display and resolution of 1 digit if calibration information is not supplied

---

**DIMENSIONS (mm)**

![Dimensions Diagram](image_url)

**TERMINAL CONNECTIONS**

<table>
<thead>
<tr>
<th>Tag Number</th>
<th>Scale</th>
<th>Tag</th>
<th>Stainless legend plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>12</td>
<td>13</td>
<td></td>
</tr>
</tbody>
</table>

**HOW TO ORDER**

Please specify:
- Model number: BA524D
- Display at 4mA: XXXX Include position of decimal point & sign if negative #
- Display at 20mA: XXXX

**Accessories**
- Please specify if required:
  - Display backlight
  - Alarms
  - Tare function
  - Lineariser
  - External keypad

**Escutcheon marking**
- Scale: Scale legend
- Tag: Tag legend
- Stainless legend plate: Legend

Pipe mounting kit: BA392D or BA393

---

*See accessory datasheet for details*
The BA526C is a new combined analogue and digital indicator which replaces the BA526. It offers enhanced features and improved visibility in a shorter enclosure. Like its predecessor, the BA526C displays the current flowing in a 4/20mA loop on a 100 segment bargraph and in accurate engineering units on a digital display. The instrument is loop powered but only introduces a 1V drop allowing it to be installed in series with almost any 4/20mA loop.

Main application of the BA526C is to display a measured variable or control signal in a process area. For level and similar measurements the combination of an analogue and digital display provides magnitude and trend information from the bargraph, plus accurate readings in engineering units from the digital display. The relative magnitude of variables can be effectively presented by mounting BA526C indicators side by side. An optional 16 point lineariser enables the BA526C to display non-linear variables in linear engineering units.

Control and calibration of the combined indicator is performed via the front panel tactile push-buttons. Using these buttons the operator can temporarily display the measured variable as a percentage of span, the input current in mA and the numerical display at 4 and 20mA input. All the calibration functions are contained in easy to understand menus which may be protected by a four digit user selectable security code.

The analogue bargraph which contains 100 segments, provides a rapid indication of the input current, enabling an operator to quickly assess the magnitude and trend of a process variable. The bargraph displays zero to full scale for a 4 to 20mA input, but may be calibrated to show deviation from any input current. Either a column or a single segment display may be selected and if only the analogue display is required, the digital display may be disabled.

Separately powered backlighting is available as an option. The orange output enhances daylight contrast and enables the display to be read when the instrument is installed in a poorly illuminated area.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed for high or low operation with a normally open or closed output. For easy comparison with the 4/20mA input, both setpoints are displayed on a second bargraph together with annunciators showing the status of both alarms.

The IP65 front panel is a robust, easy to clean Noryl moulding surrounding an armoured glass window. A captive neoprene gasket provides a seal between the instrument enclosure and the panel.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The BA526C is protected from reverse connection and overrange input currents, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.

If flammable atmospheres are present the BA326C should be used. This has the same features as the BA526C and has been certified intrinsically safe in both Europe and the USA.

BA526C
2-wire 4/20mA analogue & digital indicator

General purpose

- Loop powered only 1V drop
- Optimum visibility
- 100 segment bargraph plus digital display
- Optional: Display backlight
  Alarms
  Lineariser
- 144 x 48mm DIN enclosure with IP65 front
- 3 year guarantee

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Hitchin, Hertfordshire, SG5 2DA, U.K.
Tel. (01462) 438301 Fax (01462) 453971
e-mail sales@beka.co.uk www.beka.co.uk
**Input**
- **Current**: 4 to 20mA
- **Voltage**: Less than 1V at 20˚C
- **Overrange**: ±200mA will not cause damage

**Display**
- **Type**: Liquid crystal
- **Reading rate**
  - **Analogue**: 95mm long 100 segment column or single segment
  - **Digital**: 4 1/2 digit (-19999 to 19999) 5.5mm high; selectable dummy trailing zero extends display range to -19990 to 99990.
- **Range**: 0 to 100% for 4 to 20mA input
- **Span**: Adjustable between 0 & ±19999
- **Zero**: Adjustable between ±19999 with 4mA input
- **Decimal point**: 1 of 5 positions or absent
- **Polarity**: Automatic minus sign
- **Direction**: Display may increase or decrease with increasing current.
- **Over & Underrange**: 4 least significant digits are blanked

**Push-buttons**
- **(In operating mode)**
  - **Down button**: Shows displays with 4mA input
  - **Up button**: Shows displays with 20mA input
  - **‘P’ button**: Displays input current in mA or as a percentage of span.

**Accuracy** at 20˚C
- **Analogue**: ±0.5%
- **Digital**: Linear ±0.02% ±1 digit
- **Root extracting**: 16µA at input ±1 digit
- **Temp. effect**
  - **Analogue**: ±0.5% between -20 & 60˚C
  - **Digital**: Less than 25ppm/˚C
  - **Span**: Less than 50ppm/˚C
  - **Series mode**: Less than 0.5% error for 1mA pk to pk 50Hz or 60Hz signal.

**Environmental**
- **Operating temp**: -20 to +60˚C
- **Storage temp**: -40 to +85˚C
- **Humidity**: To 95% at 40˚C non-condensing
- **Enclosure**: Front IP65 rear IP20
- **EMC**: In accordance with EU Directive 89/336/EEC, full report available.

**Mechanical**
- **Terminals**: Removable terminal block for 0.5 to 1.5mm² cables
- **Weight**: 0.5kg

**Accessories**
- **Separately powered backlight**: LED backlight
- **Vin**: 18 to 30V dc, may be dimmed by reducing voltage below 18V.
- **Lin**: 40mA typical
- **Alarms**: Two independent alarms each of which may be programmed for high or low operation with a NC or NO output.
- **Outputs**: Isolated single pole solid state switch:
  - Ron: less than 5Ω +0.6V
  - Roff: greater than 180kΩ
- **Lineariser**: Provides 16 fully adjustable straight lines which may be adjusted to compensate for almost any non-linear variable.
- **Type set scale card**: Blank scale card fitted to each indicator can be supplied type set with units of measurement.
- **Bargraph scale**: Blank scale fitted to each indicator can be supplied type set with analogue scale.
- **Tag number**: Thermally printed number on rear of the instrument.
The BA527C is a general purpose 4½ digit panel mounting indicator which displays the current flowing in a 4/20mA loop in meaningful engineering units. The instrument is loop powered, but only introduces a 1V drop allowing it to be used in series with almost any 4/20mA loop. Modular accessories enable only the required features to be selected thus reducing cost while retaining interchangeability between instruments.

Main application of the BA527C is to display a measured variable or control signal. The zero and span of the display are independently adjustable so that the indicator can easily be calibrated to display any linear or square law signal represented by a 4/20mA current, such as temperature, flow or pressure. An optional 16 point lineariser enables the BA527C to display non-linear variables in linear engineering units, and two optional alarms will switch loads such as annunciators or relays.

Calibration and programming of the indicator is performed via the front panel tactile push-buttons which ‘click’ when operated. Using the push-buttons the operator can temporarily select the measured variable as a percentage of span, the input current in mA and the instrument calibration at 4 & 20mA. The calibration functions are contained in easy to understand menus which are protected by a four digit user selectable security code.

An internal calibrator simulates 4 and 20mA input currents so that the indicator can be calibrated without the need for test equipment or disconnection from the 4/20mA loop. Although not providing independent verification, it is an effective way to quickly check performance or to recalibrate.

Separately powered backlighting is available as an option. The orange output enhances daylight contrast and enables the display to be read when the instrument is installed in a poorly illuminated area.

Optional alarms provide two galvanically isolated solid state outputs, which may be independently programmed as high or low trips with normally open or closed contacts. The display shows when an alarm is activated, and each alarm output will switch a dc load such as an annunciator, solenoid valve or relay.

The front panel is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. A captive neoprene gasket provides an IP65 seal between the instrument enclosure and the panel.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The indicator is protected from reverse connection and overrange input current, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.

If flammable atmospheres are present a BA327C indicator should be used. This has the same features as the BA527C, but has been certified for use in hazardous areas.
### SPECIFICATION

#### Input
- Current: 4 to 20mA
- Voltage: Less than 1V at 20°C
- Overrange: ±200mA will not cause damage.

#### Display
- Type: 4½ digit (19999 to 19999)
- Liquid crystal 10mm high with optional backlighting.
- Span: Adjustable between 0 & ±19999 for a 4 to 20mA input.
- Zero: Adjustable between -19999 & 19999 with 4mA input.
- Decimal point: 1 of 4 positions or absent
- Polarity: Automatic minus sign
- Direction: Display may increase or decrease with increasing current.
- Reading rate: 2 per second
- Overrange: 4 least significant digits are blanked

#### Push-buttons
- ▼ button: Shows display with 4mA input
- ▲ button: Shows display with 20mA input
- ‘P’ button: Displays input current in mA, or as a percentage of span. When tare or alarms are fitted has modified function.

#### Accuracy
- At 20°C
  - Linear: ±0.02% of span ±1 digit
  - Root extracting: ±16µA at input ±1 digit
- Temperature effect on:
  - Zero: Less than 25ppm/°C
  - Span: Less than 50ppm/°C
  - Series mode rejection: Less than 0.05% of span error for 1mA pk to pk 50Hz or 60Hz signal

#### Environmental
- Operating temp: -20 to +60°C
- Storage temp: -40 to +85°C
- Humidity: To 95% at 40°C non-condensing
- Enclosure:
  - Rear IP20
  - Front IP65
- EMC:
    - Immunity: Less than 1% of span error for 10V/m field strength between 27MHz & 1 GHz.
    - Emissions: Undetectable above background noise. Class B equipment

#### Mechanical
- Terminals: Screw clamp for 0.5 to 1.5mm² cables. Terminal block removable.
- Weight: 0.3kg

#### Accessories
- Separately powered backlight
  - Vin: 14 to 30V dc, may be dimmed by reducing voltage below 14V.
  - lin: 40mA typical
- Alarms
  - Two independent outputs each of which may be programmed as a high or low trip with NC or NO output.
- Outputs
  - Ron: Less than 52 + 0.6V
  - Roff: Greater than 180k
  - Vmax: 30V
  - Imax: 250mA
- Tare function: Primarily intended for weighing applications, sets indicator display to zero when the ‘P’ push-button is operated.
- Lineariser: Provides 16 fully adjustable straight lines which may be adjusted to compensate for almost any non-linear variable.
- Typeset scale card: Blank scale card fitted to each indicator can be supplied typeset with units of measurement.
- Tag number: Thermally printed tag number on rear of the instrument.

**Typeset scale card**: Blank scale card fitted to each indicator can be supplied typeset with units of measurement.*

\[ \text{Recommended panel cut-out} \]

**Panel cut-out**

<table>
<thead>
<tr>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>96</td>
</tr>
</tbody>
</table>

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

Please specify:
- Model number
- Display mode
- Display at 4mA
- Display resolution
- Accessories
- Tare function
- Lineariser
- Scale card
- Tag number

*Will be set to display 0.00 at 4mA and 100.00 at 20mA with linear display mode and resolution of 1 digit if calibration information is not supplied.

#Contact BEKA if calibration of accessories is required.
The BA528C is a general purpose 4½ digit panel mounting indicator which displays the current flowing in a 4/20mA loop in meaningful engineering units. The instrument is loop powered, but only introduces a 1V drop allowing it to be used in series with almost any 4/20mA loop. Modular accessories enable only the required features to be selected thus reducing cost while retaining interchangeability between instruments.

**Main application** of the BA528C is to display a measured variable or control signal. The zero and span of the display are independently adjustable so that the indicator can easily be calibrated to display any linear or square law signal represented by a 4/20mA current, such as temperature, flow or pressure. An optional 16 point lineariser enables the BA528C to display non-linear variables in linear engineering units, and two optional alarms will switch loads such as annunciators or relays.

**Calibration** and programming of the indicator is performed via the front panel tactile push-buttons which ‘click’ when operated. Using the push-buttons the operator can temporarily select the measured variable as a percentage of span, the input current in mA or the instrument calibration at 4 & 20mA. The calibration functions are contained in easy to understand menus which are protected by a four digit user selectable security code.

An internal calibrator simulates 4 and 20mA input currents so that the indicator can be calibrated without the need for test equipment or disconnection from the 4/20mA loop. Although not providing independent verification, it is an effective way to quickly check performance or to recalibrate.

Separately powered backlighting is available as an option. The orange output enhances daylight contrast and enables the display to be read when the instrument is installed in a poorly illuminated area.

Optional alarms provide two galvanically isolated solid state outputs, which may be independently programmed as high or low trips with normally open or closed contacts. The display shows when an alarm is activated, and each alarm output will switch a dc load such as an annunciator, solenoid valve or relay.

The front panel is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. A captive neoprene gasket provides an IP65 seal between the instrument enclosure and the panel.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The indicator is protected from reverse connection and overrange input current, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.

If flammable atmospheres are present a BA328C indicator should be used. This has the same features as the BA528C, but has been certified for use in hazardous areas.

---

**BA528C**

2-wire 4/20mA

4½ digit indicator

**General purpose**

- ±19999 display
- 20mm high
- Loop powered
- only 1V drop
- Internal calibrator
- & root extractor
- Optional:
  - Backlight
  - Alarms
  - Lineariser
  - Tare function
- IP65 front
- 144 x 72mm DIN enclosure
- 3 year guarantee

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BEKA associates Ltd. Old Charlton Rd. Hitchin, Hertfordshire, SG5 2DA, U.K.
Tel. (01462) 438301 Fax (01462) 453971
e-mail sales@beka.co.uk   www.beka.co.uk
Input
Current 4 to 20mA
Voltage Less than 1V at 20˚C
  less than 1.1V at -20˚C
  ±200mA will not cause damage.

Display
Type 4 1/2 digit (-19999 to 19999)
Span Liquid crystal 20mm high
Adjustable between 0 & ±19999
for a 4 to 20mA input.
Zero Adjustable between -19999 & 19999 with 4mA input.
Decimal point 1 of 4 positions or absent
Zero blanking Only one leading zero is displayed
Polarity Automatic minus sign
Direction Display may increase or decrease with increasing current.
Reading rate 2 per second
Overrange 4 least significant digits are blanked

Push-buttons
▼ button Shows display with 4mA input
▲ button Shows display with 20mA input
‘P’ button Displays input current in mA, or as a percentage of span.
When tare or alarms are fitted it has modified function.

Accuracy
At 20˚C Linear: ±0.02% of span ±1 digit
Root extracting: ±16µA at input ±1 digit
Temperature effect on:
  Zero Less than 25ppm/˚C
  Span Less than 50ppm/˚C
  Series mode rejection Less than 0.05% of span error for 1mA pk to pk 50Hz or 60Hz signal

Environmental
Operating temp -20 to +60˚C
Storage temp -40 to +85˚C
Humidity To 95% at 40˚C non-condensing
Enclosure Rear IP20
  Front IP65
EMC In accordance with EU Directive 89/336/EEC, full report available.
  Immunity Less than 1% of span error for 10V/m field strength between 27MHz & 1 GHz.
  Emissions Undetectable above background noise. Class B equipment

Mechanical
Terminals Screw clamp for 0.5 to 1.5mm² cables.
  Terminal block removable.
Weight 0.5kg

Accessories
Separately powered backlight
Vin 18 to 30V dc, may be dimmed by reducing voltage below 18V.
  In 40mA typical
Alarms Two independent outputs each of which may be programmed as a high or low trip
  with NC or NO output.
Outputs Isolated solid state switch, single pole
  Ron Less than 50 + 0.6V
  Roff Greater than 180k
  Vmax 30V
  Imax 250mA
Tare function Primarily intended for weighing applications, sets indicator display to zero when the ‘P’ push-button is operated.
Lineariser Provides 16 fully adjustable straight lines which may be adjusted to compensate for almost any non-linear variable.
Typeset scale card Blank scale card fitted to each indicator can be supplied typeset with units of measurement.
Tag number Thermally printed tag number on rear of the instrument.
Front cover BA398 provides additional mechanical protection: front panel switches can not be operated.

Model number BA528C
Display mode Linear or root extracting*
Display at 4mA & 20mA
Display resolution Include position of decimal point
Accessories
table include position of decimal point
Tag strip
Front cover

Separately powered backlight
Tare
Lineariser
Legend
BA398

Please specify
BA528C
Linear or root extracting*
XXX
Include position of decimal point
XXX
& sign if display is negative*
1, 2, 5 or 10 digits*

*Will be set to display 0.00 at 4mA and 100.00 at 20mA with linear display mode and resolution of 1 digit if calibration information is not supplied.
This range of high quality LED panel meters have robust metal enclosures and easy to clean IP65 sealed front panels. Models are available for voltage, current, thermocouple and resistance thermometer inputs and all are supported by a three year guarantee.

Advisor panel meters have bright LED displays and are supplied with a set of pre-printed scale labels containing most common units of measurement. A range of accessories, including alarms and transmitter power supplies, further extend their applications. The meters are factory set for use with a 24Vdc, 115Vac or 230Vac supply and can be supplied calibrated to customers requirements for no additional charge.

To select the model for your application, please refer to the summary on the following page.
Common features for all Advisor panel meters

**Bezel size**
- **Power supply**
  - 96 x 48mm
  - Factory set
  - 24Vdc, 115Vac or 230Vac

**Display**
- 4 digit LED
- 14.2mm high

**Protection**
- Front: IP65
- Rear: IP20

## Model Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>A70</th>
<th>A75</th>
<th>A80</th>
<th>A85</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page</td>
<td>51</td>
<td>53</td>
<td>55</td>
<td>57</td>
</tr>
<tr>
<td>Function</td>
<td>Single range process meter</td>
<td>Universal process meter</td>
<td>RTD Temperature meter</td>
<td>THC Temperature meter</td>
</tr>
<tr>
<td>Input</td>
<td>Factory set 0 - 100mV 0 - 500mV 0 - 2V 1 - 5V 0 - 20mA 0 - 50mA 0 - 0.5A or 0 - 2A</td>
<td>Programmable on-site 0 - 200mV 0 - 500mV 0 - 2V 1 - 5V 0 - 20mA 0 - 50mA</td>
<td>Resistance thermometer 0 - 200mV 0 - 500mV 0 - 2V 1 - 5V 0 - 20mA 0 - 50mA</td>
<td>Programmable on-site 0 - 200mV 0 - 500mV 0 - 2V 1 - 5V 0 - 20mA 0 - 50mA</td>
</tr>
<tr>
<td>Options:</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Transmitter power supply</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Transducer power supply</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4/20mA output</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Alarms</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Tare function</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
The Advisor A70 is a panel meter for displaying process variables in engineering units. Although low cost, performance has not been sacrificed. The meter is housed in a robust enclosure with a high quality display, push-buttons and terminals and will provide many years of reliable service.

Main application of the A70 is to display a current or voltage such as 4/20mA or 0/10V in engineering units. The instrument is supplied with one of fifteen standard input ranges, and can be calibrated on-site to display this input in any linear engineering units such as level, pressure or position. For flow applications all A70 meters include a selectable root extractor to linearise the display. Optional accessories which further extend the applications include an isolated supply to power a remote 2-wire transmitter, a four wire transducer power supply, a 4/20mA isolated output proportional to the display, and two alarms. To prevent operators being dazzled, the display brilliance is continuously adjustable from the front panel.

Calibration and programming is performed via the four front panel push-buttons which ‘click’ when operated. To prevent accidental or unauthorised adjustment, the programming functions are contained in easy to understand menus protected by a four digit user definable security code. All the instrument functions, except the type of input, are programmable. The display can easily be recalibrated on-site using the internal references or an external voltage or current source. Loss of power does not affect calibration as all settings are retained for at least five years after power loss or disconnection.

The front panel is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. All A70 panel meters have a captive neoprene gasket which provides an IP65 seal between the enclosure and the panel, thus making the instrument suitable for installation in panels which are frequently hosed down.

The transmission power supply is an optional fully isolated dc supply which may be used to power any external instrument which consumes less than 22mA. It is primarily intended for energising remote loop powered 4/20mA temperature or pressure transmitters.

An optional isolated four wire power supply is available for powering remote bridges, enabling the A70 panel meter to display linear weights and pressures without the need for a separate transmitter. The sensing wires eliminate the effect of cable resistance, and five different output voltages may be selected by the position of an internal link.

A 4/20mA current proportional to the A70 display is obtainable from the optional re-transmitted output. This current is fully isolated and may be programmed to represent any part of the display.

For weighing applications an optional tare function modifies the operation of the front panel push-buttons so the display may be zeroed at any input. The initial reading is therefore automatically subtracted from subsequent readings. A front panel LED is illuminated when the tare button has been operated.

Optional alarms provide two channels, each with a relay output which may be independently programmed as a high or low trip. The alarm set-points are adjusted via the front panel push-buttons and may be accessed from the display mode via a separate security code. Separate front panel LED annunciators show the status of each alarm.

Reliability is ensured by an ISO9001 approved quality control system. The A70 is protected from reverse connection and overrange inputs, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.

A universal panel meter with programmable inputs is also available, see datasheet for Advisor A75.
**SPECIFICATION**

**Supply**
- Voltage: 10 to 35Vdc
- 99 to 132Vac 50/60Hz 4W max
- 198 to 264Vac 50/60Hz

**Display**
- Type: 4 digit LED 14.2mm high with adjustable brilliance.
- Zero: Adjustable between -1999 and 9999
- Decimal point: Can be set between -1999 and 9999
- Span: Adjustable between 0 and ±11989
- Decimal point: Selectable or absent
- Zero blanking: Only 1 leading zero is displayed
- Overrange: Displays -1 or 1
- Reading rate: Greater than 2 per second

**Push-buttons**
- Down: Shows display at minimum input
- Up: Shows display at maximum input
- Scroll: Displays input in mA or volts, or as a percentage of input range.

**Input**
- One factory set range selected at time of ordering from:
  - Range: 0 - 100mV, 0 - 200mV, 0 - 500mV, 0 - 1V, 0 - 2V, 0 - 5V, 1 - 5V, 0 - 10V, 0 - 20mA, 4 - 20mA, 0 - 50mA, 10 - 50mA, 0 - 0.5A, 0 - 1A, and 0 - 2A.

**Impedance**
- Voltage ranges: Greater than 1MΩ
- Current ranges: Less than 10Ω

**Isolation**
- 500V rms between input, power supply and optional accessory outputs.

**Performance**
- Accuracy including non-linearity at 20°C:
  - Linear: ±0.05% of display ±1/2 digit
  - Root extracting: ±0.1% of range at input ±1 digit
  - Clip-off: Meter displays 0 below 5% input
  - Resolution: 1 part in 10,000
  - Series mode: Less than 1% error for 200mV rms
  - Rejection: 45 - 55Hz. 2% at 60Hz
  - Common mode: Less than 0.2% error for 250V rms
  - Rejection: 50Hz.
  - Temp. effect: Zero drift: 50ppm max/°C of display span
  - Span drift: 100ppm max/°C of display span

**Environmental**
- Operating temp: -20 to +50°C
- Storage temp: -40 to +85°C
- Humidity: 95% at 40°C non-condensing
- Enclosure: Front IP65 rear IP20

**Mechanical**
- Terminals: Screw clamp for 0.5 to 1.5mm² cables
- Weight:
  - 24Vdc: 0.25kg
  - 110 & 230Vac: 0.45kg

**Accessories**
- Transmitter power supply: 24Vdc at 22mA max short circuit protected
- Transducer supply: 5V, 10V, 12V or 15V at 22mA
- Two sense wires eliminate effect of cable resistance.
- Drift: Less than 100ppm/°C
- Alarms: Two independent alarm channels
- Output: Single pole change over contact
- Rating: 250V, 5A ac; 30V, 5A dc
- Programmable functions: High and low trip. Latching or non-latching
- 4/20mA output: Isolated analogue output programmable to represent any part of the display.
- Load: 500Ω maximum
- Tare function: Primarily intended for weighing applications, sets meter display to zero when button is operated. Function indicated by front panel LED.
- Typeset scale card: Selection of common units supplied with each instrument. Custom typeset card can be supplied.
- Tag number: Thermally printed number on rear of the instrument.

**How to Order**
- Please specify:
  - Model number: A70
  - Power supply: 24Vdc, 115Vac or 230Vac
  - Required factory set input range:
    - 0 - 100mV, 0 - 200mV, 0 - 500mV, 0 - 1V,
    - 0 - 2V, 0 - 5V, 1 - 5V, 0 - 10V, 0 - 20mA,
    - 4 - 20mA, 0 - 50mA, 10 - 50mA, 0 - 0.5A,
    - 0 - 1A, or 0 - 2A.
  - Display:
    - Root extractor: ON or OFF*
  - Tare function: Required display at zero and full scale input.*
- Accessories:
  - Transmitter power supply
  - Transducer power supply
  - 4/20mA retransmitted output
  - Meter display for 4mA
  - Meter display for 20mA

**DIMENSIONS (mm)**

- Recommended panel cut-out:
  - DIN 43 700
  - 92.0 +0.8/-0.0 x 45 +0.6/-0.0
  - To achieve an IP65 seal between the instrument and the panel:
    - 90 +0.5/0.0 x 43.5 +0.5/0.0

**TERMINAL CONNECTIONS**

- Terminal cut-outs are shown in outline

**HOW TO ORDER**

<table>
<thead>
<tr>
<th>Input</th>
<th>Optional alarms</th>
<th>Power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>+24V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ O/P</td>
<td>Alarm 1</td>
<td>Alarm 2</td>
</tr>
<tr>
<td>N/C</td>
<td>N/O</td>
<td></td>
</tr>
</tbody>
</table>

- Optional transmitter power supply
- Optional transducer power supply
- Optional 4/20mA output (Source)

**Recommended Panel Cut-Out**

- DIN 43 700
- 92.0 +0.8/-0.0 x 45 +0.6/-0.0
- To achieve an IP65 seal between the instrument and the panel:
- 90 +0.5/0.0 x 43.5 +0.5/0.0

**TERMINAL CONNECTIONS**

- 115V ac & 230V ac models
- 24V dc model

**TERMINAL CONNECTIONS**

<table>
<thead>
<tr>
<th>Input</th>
<th>Optional alarms</th>
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<td>N/O</td>
<td></td>
</tr>
</tbody>
</table>

- Optional transmitter power supply
- Optional transducer power supply
- Optional 4/20mA output (Source)

**TERMINAL CONNECTIONS**

- 115V ac & 230V ac models
- 24V dc model

**TERMINAL CONNECTIONS**

- 115V ac & 230V ac models
- 24V dc model

**TERMINAL CONNECTIONS**

- 115V ac & 230V ac models
- 24V dc model

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- 115V ac & 230V ac models
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- 115V ac & 230V ac models
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**TERMINAL CONNECTIONS**

- 115V ac & 230V ac models
- 24V dc model

**TERMINAL CONNECTIONS**

- 115V ac & 230V ac models
- 24V dc model

**TERMINAL CONNECTIONS**

- 115V ac & 230V ac models
- 24V dc model

**TERMINAL CONNECTIONS**

- 115V ac & 230V ac models
- 24V dc model

**TERMINAL CONNECTIONS**

- 115V ac & 230V ac models
- 24V dc model

**TERMINAL CONNECTIONS**

- 115V ac & 230V ac models
- 24V dc model
The Advisor A75 is a universal panel meter for displaying process variables in engineering units. In addition to the features offered by the fixed range A70, the A75 has twelve on-site selectable process voltage and current inputs. The meter is housed in a robust enclosure with high quality push-buttons, display and terminals and will provide many years of reliable service.

Main application of the A75 is to display a current or voltage such as 4/20mA or 0/10V in engineering units. Twelve different input ranges can be selected, and the meter may be calibrated to display the input in any linear engineering units such as level, pressure or position. For flow applications the A75 includes a selectable root extractor to linearise the display. Optional accessories which further extend the applications include an isolated supply to power a remote 2-wire transmitter, a four wire transducer power supply, a 4/20mA isolated output proportional to the display, and two alarms. To prevent operators being dazzled, the display brilliance is continuously adjustable from the front panel.

Calibration and programming is performed via the four front panel push-buttons which ‘click’ when operated. To prevent accidental or unauthorised adjustment, the programming functions are contained in easy to understand menus protected by a four digit user definable security code. All the instrument functions are programmable. The display can easily be recalibrated on-site using the internal references or an external voltage or current source. Loss of power does not affect calibration as all settings are retained for at least five years after power loss or disconnection.

The front panel is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. All A75 panel meters have a captive neoprene gasket which provides an IP65 seal between the enclosure and the panel, thus making the instrument suitable for installation in panels which are frequently hosed down.

The Advisor A75 is a universal panel meter for displaying process variables in engineering units. In addition to the features offered by the fixed range A70, the A75 has twelve on-site selectable process voltage and current inputs. The meter is housed in a robust enclosure with high quality push-buttons, display and terminals and will provide many years of reliable service.

Main application of the A75 is to display a current or voltage such as 4/20mA or 0/10V in engineering units. Twelve different input ranges can be selected, and the meter may be calibrated to display the input in any linear engineering units such as level, pressure or position. For flow applications the A75 includes a selectable root extractor to linearise the display. Optional accessories which further extend the applications include an isolated supply to power a remote 2-wire transmitter, a four wire transducer power supply, a 4/20mA isolated output proportional to the display, and two alarms. To prevent operators being dazzled, the display brilliance is continuously adjustable from the front panel.

Calibration and programming is performed via the four front panel push-buttons which ‘click’ when operated. To prevent accidental or unauthorised adjustment, the programming functions are contained in easy to understand menus protected by a four digit user definable security code. All the instrument functions are programmable. The display can easily be recalibrated on-site using the internal references or an external voltage or current source. Loss of power does not affect calibration as all settings are retained for at least five years after power loss or disconnection.

The front panel is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. All A75 panel meters have a captive neoprene gasket which provides an IP65 seal between the enclosure and the panel, thus making the instrument suitable for installation in panels which are frequently hosed down.
**Supply**
- Voltage: 10 to 35Vdc, 99 to 132Vac 50/60Hz, 198 to 264Vac 50/60Hz
- 4W max

**Display**
- Type: 4 digit LED 14.2mm high with adjustable brilliance
- Zero: Adjustable between -1999 and 9999
- Span: Adjustable between 0 and ±11989
- Decimal point: 1 of 4 positions selectable or absent
- Zero blanking: Only 1 leading zero is displayed
- Polarity: Automatic minus sign
- Overrange: Displays -1 or 1
- Reading rate: Greater than 2 per second

**Push-buttons**
- Down (▼): In operating mode without accessories, shows display at minimum input
- Up (▲): Shows display at maximum input
- Scroll: Displays input in mA or volts, or as a percentage of input range. When tare or alarm accessories are fitted has modified function.

**Input**
- Range: Selectable on-site
  - 0 - 100mV, 0 - 200mV, 0 - 500mV, 0 - 1V, 0 - 2V, 0 - 5V, 1 - 5V, 0 - 10V, 0 - 20mA, 4 - 20mA, 0 - 50mA or 10 - 50mA.

**Impedance**
- Voltage ranges: Greater than 1MΩ/9024
- Current ranges: Less than 10⁻⁶/9024

**Isolation**
- 500V rms between input, power supply and optional accessory outputs.

**Performance**
- Accuracy including non-linearity at 20°C:
  - Linear: ±0.05% of span ±1/2 digit
  - Root extracting: ±0.1% of range at input ±1 digit
  - Clip-off: Meter displays 0 below 5% flow
- Resolution: 1 part in 10,000
- Series mode ac rejection: Less than 1% error for 200mV rms
- Common mode ac rejection: Less than 0.2% error for 250V rms
- Temp. effect:
  - Zero drift: 50ppm max/°C of display span
  - Span drift: 100ppm max/°C of display span

**Environmental**
- Operating temp: -20 to +50°C
- Storage temp: -40 to +85°C
- Humidity: To 95% at 40°C non-condensing
- Enclosure: Front IP65 rear IP20

**Mechanical**
- Terminals: Screw clamp for 0.5 to 1.5mm² cables
- Weight:
  - 24Vdc: 0.25kg
  - 110 & 230Vac: 0.45kg

**Accessories**
- Transmitter power supply: 24Vdc at 22mA max short circuit protected
- Transducer supply: 24Vdc at 22mA
- Two sense wires eliminate affect of cable resistance
- Drift: Less than 100ppm/°C
- Alarms:
  - Two independent alarm channels
  - Output: Single pole change over contact
  - Rating: 250V, 5A ac; 30V, 5A dc
- Programmable functions:
  - High or low trip. Latching or non-latching
  - 4/20mA output: Isolated analogue output programmable to represent any part of the display.
- Load: 500Ω maximum
- Tare function: Primarily intended for weighing applications.
- Typeset scale card: Selection of common units supplied with each instrument. Custom typeset card can be supplied.
- Tag number:
  - Thermally printed number on rear of the instrument.

**Terminal Connections**

**How to Order**
- Model number: Please specify
- Power supply:
  - Input range: 24Vdc, 115Vac or 230Vac
  - 0 - 100mV, 0 - 200mV, 0 - 500mV, 0 - 1V, 0 - 2V, 0 - 5V, 1 - 5V, 0 - 10V, 0 - 20mA, 4 - 20mA, 0 - 50mA or 10 - 50mA.
- Display:
  - Root extractor: ON or OFF*
- Alarms:
  - Will be calibrated 4/20mA input, with 0 to 100.0 display and rooter OFF, if information is not supplied. Can easily be re-calibrated on-site.

**Accessories**
- Transmitter power supply: Please specify if required
- Transducer power supply: Transmitter supply
- Output voltage: 4/20mA retransmitted output
- 4/20mA output: Meter display for 4mA
- Meter display for 20mA

**Terminals**

**Dimensions (mm)**

**Recommended panel cut-out**
- 96.0 +0.8/-0.0 x 45 +0.6/-0.0
- To achieve an IP65 seal between the instrument and the panel
- 90 +0.5/-0.0 x 43.5 +0.5/-0.0
The Advisor A80 is a panel meter which provides an accurate temperature display from a Pt100 resistance thermometer. The meter is housed in a robust enclosure and incorporates a high quality display, push-buttons and terminals to ensure many years of reliable service. For thermocouple inputs, the complementary Advisor A85 has similar features.

Main application of the A80 is to display process temperature, although the instrument is equally suitable for use in laboratory and non-industrial applications. Units of display may be °C or °F, and the minimum and maximum displayed temperatures may be recalled from the front panel push-buttons. Accessories include a 4/20mA isolated output proportional to the display, and two alarms with relay contact outputs. To prevent operators being dazzled, the display brilliance is continuously adjustable from the front panel.

Calibration and programming is performed via the front panel push-buttons. To prevent accidental or unauthorised adjustment all programming functions are contained in easy to understand menus protected by a four digit user definable security code. The display can easily be recalibrated on-site using the internal references or an external temperature calibrator. Loss of power does not affect calibration as all settings are retained for at least five years after the instrument is switched off or disconnected.

A 4/20mA current proportional to the A80 display is obtainable from the optional re-transmitted output. This current is fully isolated and may be programmed to represent any part of the display range.

Optional alarms provide two channels each with a single pole change-over contact output which may be independently programmed as a high or low trip. The alarm set-points are adjusted via the front panel push-buttons and may be accessed from the display mode via a separate security code. Front panel LED annunciators show the status of each alarm.

Reliability is ensured by an ISO9001 approved quality control system. The A80 is protected from reverse connection and overrange inputs, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.

Process input meters are also available, see datasheets for Advisor A70 and A75.
**SPECIFICATION**

**Supply**
- Voltage: 10 to 35Vdc, 99 to 132Vac 50/60Hz, 198 to 264Vac 50/60Hz, 4W max

**Display**
- Type: 4 digit LED 14.2mm high with adjustable brilliance.
- Zero blanking: Only 1 leading zero is displayed
- Polarity: Automatic minus sign
- Overrange: Displays -1 or 1
- Reading rate: Greater than 2 per second

**Push-buttons**
- In operating mode without accessories
  - Down: Shows minimum temperature
  - Up: Shows maximum temperature
  - Scroll: Only functions when alarms are fitted.

**Input**
- Type: 3-wire Pt100 BS EN60751:1996 resistance thermometer. Accepts two RTDs for differential measurements.
  - Range: -200.0 to 850.0°C
  - Excitation: 460µA
  - Resolution: Selectable 0.1 or 1°C (F display: Fixed 1°F
  - Isolation: 500V rms between input, power supply and optional accessory outputs.

**Performance**
- Accuracy: Including non-linearity at 20°C ±0.05% of span ±1/2 digit
- Series mode ac rejection: Less than 1% error for 200mV rms 45 - 60Hz, 2% at 60Hz
- Common mode ac rejection: Less than 0.1% error for 250V rms 50Hz.
- Temp. effect
  - Zero drift: 50ppm max/°C of display span
  - Span drift: 100ppm max/°C of display span

**Environmental**
- Operating temp: -20 to +50°C
- Storage temp: -40 to +85°C
- Humidity: To 95% at 40°C non-condensing
- Enclosure: Front IP65 rear IP20
- LVD: In accordance with EU Directive 73/23/EEC.

**Mechanical**
- Terminals: Screw clamp for 0.5 to 1.5mm² cables
- Weight: 24Vdc 0.25kg, 110 & 230Vac 0.45kg

**Accessories**
- Alarms: Two independent alarm channels
  - Output: Single pole change over contact
  - Rating: 250V 5A ac; 30V 5A dc
  - Programmable functions: High or low trip. Latching or non-latching
  - 4/20mA output: Isolated analogue output programmable to represent any part of the display.
  - Load: 500 ohms maximum
- Typeset scale card: Selection of common units supplied with each instrument. Custom typeset card can be supplied.
- Tag number: Thermally printed number on rear of the instrument.

**DIMENSIONS (mm)**
- Recommended panel cut-out: DIN 43 700
- To achieve an IP65 seal between the instrument and the panel: 90+0.5/-0.0 x 43.5+0.5/-0.0

**TERMINAL CONNECTIONS**

**HOW TO ORDER**
- Model number: A80
- Power supply: 24Vdc, 115Vac or 230Vac
- Display units: °C or °F*
- Display resolution: High or low *
- 4/20mA output: Isolated analogue output programmable to represent any part of the display.
- Load: 500 ohms maximum
- Typeset scale card: Selection of common units supplied with each instrument. Custom typeset card can be supplied.
- Tag number: Thermally printed number on rear of the instrument.

*Will be set for °C with high resolution if calibration information is not supplied.

**Accessories**
- 4/20mA retransmitted output
- Meter display for 4mA output
- Meter display for 20mA output
- Alarms: Legend
- Custom scale card: Legend
The Advisor A85 is a panel meter which provides an accurate temperature display from most common thermocouples. The meter is housed in a robust enclosure and incorporates a high quality display, push-buttons and terminals to ensure many years of reliable service. For resistance thermometer inputs, the complementary Advisor A80 has similar features.

Main application of the A85 is to display process temperature, although the instrument is equally suitable for use in laboratory and non-industrial applications. The A85 may be programmed on-site to operate with seven different thermocouples, and includes facilities for differential temperature measurement. Units of display may be °C or °F, and the minimum and maximum displayed temperatures may be recalled from the front panel push-buttons. Accessories include a 4/20mA isolated output proportional to the display, and two alarms with relay contact outputs. To prevent operators being dazzled, the display brilliance is continuously adjustable from the front panel.

Calibration and programming is performed via the front panel push-buttons. To prevent accidental or unauthorised adjustment all programming functions are contained in easy to understand menus protected by a four digit user definable security code. The display can easily be recalibrated on-site using the internal references or an external voltage source. Loss of power does not affect calibration as all settings are retained for at least five years after power loss or disconnection.

The front panel is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. All A85 panel meters have a captive neoprene gasket which provides an IP65 seal between the enclosure and the panel, thus making the instrument suitable for installation in panels which are frequently hosed down.

A 4/20mA current proportional to the A85 display is obtainable from the optional re-transmitted output. This current is fully isolated and may be programmed to represent any part of the display.

Optional alarms provide two channels each with a single pole change-over contact output which may be independently programmed as a high or low trip. The alarm set-points are adjusted via the front panel push-buttons and may be accessed from the display mode via a separate security code. Front panel LED annunciators show the status of each alarm.

Reliability is ensured by an ISO9001 approved quality control system. The A85 is protected from reverse connection and overrange inputs, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.
### Supply
- **Voltage**: 10 to 35Vdc, 99 to 132Vac 50/60Hz, 198 to 264Vac 50/60Hz, 4W max

### Display
- **Type**: 4 digit LED 14.2mm high with adjustable brilliance.
- **Zero blanking**: Only 1 leading zero is displayed.
- **Polarity**: Automatic minus sign.
- **Overrange**: Displays -1 or 1.
- **Resolution**: Selectable 1°C or maximum.
- **Reading rate**: Greater than 2 per second.

### Push-buttons
- **In operating mode without accessories**
  - **Down**: Shows minimum temperature.
  - **Up**: Shows maximum temperature.
  - **Scroll**: Only functions when alarms are fitted.

### Input
- **Thermocouple type**: Selectable on-site.
- **Display range between 25 & 75% of span**:
  - E: -199.9 to 999.9 (-270 to 1000) 0.2
  - J: -199.9 to 999.9 (-210 to 1200) 0.2
  - K: -199.9 to 999.9 (-270 to 1372) 0.3
  - N: -199.9 to 999.9 (-270 to 1300) 0.3
  - R: -48.3 to 999.9 (-48 to 1767) 1.0
  - T: -199.9 to 400.0 (-270 to 400) 0.2
  - Pallaplat: -100.0 to 490.0 (-100 to 490) 0.3

### Resolution
- **°C display**: Selectable 0.1°C or 1°C.
- **°F display**: Fixed 1°F.

### Performance
- **Accuracy**: Including non-linearity at 20°C ±0.1% of span ±1/2 digit.
- **Series mode ac rejection**: Less than 1% error for 200mV rms 45 - 50Hz, 2% at 60Hz.
- **Common mode ac rejection**: Less than 0.1% error for 250V rms 50Hz.
- **Temp. effect**:
  - **Zero drift**: 50ppm max/°C of display span
  - **Span drift**: 100ppm max/°C of display span

### Environmental
- **Operating temp**: -20 to +50°C
- **Storage temp**: -40 to +85°C
- **Humidity**: To 95% at 40°C non-condensing.
- **Enclosure**: Front IP65 rear IP20.
- **LVD**: In accordance with EU Directive 73/23/EEC.

### Mechanical
- **Terminals**: Screw clamp for 0.5 to 1.5mm² cables.
- **Weight**:
  - 24Vdc: 0.25kg
  - 110 & 230Vac: 0.45kg

### Accessories
- **Alarms**: Two independent alarm channels.
- **Output**:
  - Single pole change over contact.
  - 250V 5A ac; 30V 5A dc.
- **Rating**:
  - 250V 5A ac; 30V 5A dc.
  - High or low trip. Latching or non-latching.
- **Programmable function**:
  - Isolated analogue output programmable to represent any part of the display.
  - 500 U maximum.
- **4/20mA output**:
  - Selection of common units supplied with each instrument. Custom typeset card can be supplied.
- **Load**: Thermally printed number on rear of the instrument.

### How to Order
- **Model number**: AB5
- **Power supply**: 24Vdc, 115Vac or 230Vac.
- **Input**: E, J, K, N, R, T or pallaplat.*
- **CJ compensation**: On or Off.
- **Display units**: °C or °F.*
- **Display resolution**: High or low.*
- **Broken THC drive**: Up, Down or Off.*

*Will be set for K input; °C; high resolution with no broken THC drive if calibration information is not supplied.

### TerminaL Connections
- **Input**
- **Output**
- **Optional alarms**
- **Power supply**

### Recommended panel cut-out
- DIN 43 700
- Recommended panel cut-out:
  - To achieve an IP65 seal between the instrument and the panel
  - 90 ±0.5/-0.0 x 43.5 ±0.5/-0.0

### Terminal Connections
- **Input**
- **Output**
- **Optional alarms**
- **Power supply**

### Specification
- **Supply**
  - Voltage: 10 to 35Vdc, 99 to 132Vac 50/60Hz, 198 to 264Vac 50/60Hz, 4W max.

### Dimensions (mm)
- **Recommended panel cut-out**:
  - DIN 43 700
  - Recommended panel cut-out:
    - 90 ±0.5/-0.0 x 43.5 ±0.5/-0.0

### How to Order
- **Model number**: AB5
- **Power supply**: 24Vdc, 115Vac or 230Vac.
- **Input**: E, J, K, N, R, T, or pallaplat.*
- **CJ compensation**: On or Off.
- **Display units**: °C or °F.*
- **Display resolution**: High or low.*
- **Broken THC drive**: Up, Down or Off.*

*Will be set for K input; °C; high resolution with no broken THC drive if calibration information is not supplied.

### Accessories
- **Alarms**
- **Output**
- **Optional alarms**
- **Power supply**

### How to Order
- **Model number**: AB5
- **Power supply**: 24Vdc, 115Vac or 230Vac.
- **Input**: E, J, K, N, R, T, or pallaplat.*
- **CJ compensation**: On or Off.
- **Display units**: °C or °F.*
- **Display resolution**: High or low.*
- **Broken THC drive**: Up, Down or Off.*

*Will be set for K input; °C; high resolution with no broken THC drive if calibration information is not supplied.

### Accessories
- **Alarms**
- **Output**
- **Optional alarms**
- **Power supply**
Loop powered manual set point stations enable the current flowing in a 4/20mA loop to be adjusted via a ten turn control. The set point station contains a digital display which may be calibrated to show the 4/20mA current in engineering units and is thus ideal for remotely adjusting a controller set point.

Two panel mounting models are available, one has ATEX and FM intrinsic safety certification allowing installation in hazardous areas, the other is a general purpose model for safe area applications.

Application Guide AG404 describing the certification and use of intrinsically safe set point stations is available from the BEKA web site or sales office.

*To select the model for your application, please refer to the summary on the following page.*
Select a set point station for your application from:

### Intrinsically safe models

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### General purpose models

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<tr>
<td>Options</td>
<td>Yes</td>
</tr>
<tr>
<td>Separately powered backlight</td>
<td>Yes</td>
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</table>
The BA405C is an intrinsically safe panel mounting manual set point station that enables the current flowing in a 4/20mA loop to be manually adjusted from within a hazardous area. The instrument is loop powered and contains a 3½ digit display which may be calibrated to show the 4/20mA current in engineering units.

Main application of the BA405C is the adjustment of plant parameters from within a hazardous process area. Speed controller set points such as a vessel mixer, actuator positions or any parameter represented by a 4/20mA signal can be adjusted from within the hazardous area. The BA405C incorporates a ten turn high resolution potentiometer fitted with a friction damper to minimise the risk of accidental adjustment. The magnitude of the variable being adjusted is shown on a 3½ digit display which may be calibrated in engineering units. An operator can therefore accurately set the process parameter to the required value.

ATEX intrinsic safety certification confirms compliance with the requirements for Group II Category 1G equipment EEx ia IIC T5, allowing the BA405C to be installed in almost all gas hazardous areas throughout Europe. For use in the USA the BA405C has FM intrinsic safety and nonincendive approval.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. Set point stations are protected from reverse connection and overrange input current, and incorporate radio frequency filtering to comply with the European EMC Directive.
SPECIFICATION

Output
Current Typ 3.5 to 21mA
Resistance Greater than 1M

Power Supply
Voltage
6.1 to 30V
10 to 30V with optional loop powered backlight

Accuracy
Control resolution 0.05% of maximum output
Temperature effect Less than 2µA/oC

Display
Type 3½ digit LCD
Zero Adjustable between -1000 & 1000
Span Adjustable between 000 & 1999
Polarity Automatic minus sign
Decimal point 1 of 3 positions or absent selected by internal plug-in link.

Intrinsic safety
Europe ATEX
Standard EN 50 020:2002
Cert No ITS03ATEX21103
Location Zone 0, 1 or 2
Installation 4/20mA output May be connected to any EEx ia certified barrier or isolator with output parameters equal to, or less than:

Uo = 30V
Io = 200mA
Po = 0.85W

USA FM
Standard 3610 Entity
Code CL I: Div 1; GP. A, B, C, D
File No 3026081
Standard 3611 Nonincendive
Code CL I: Div 2; GP. A, B, C, D
File No 3026081

Environmental
Operating temperature -20 to +60°C
Storage temp -40 to +85°C
Humidity To 95% at 40°C non-condensing
Enclosure Front IP65
Rear IP20
EMC In accordance with EU Directive 89/336/EEC, full report available.
Immunity Less than 1% of span error for 10V/m field strength between 27MHz & 1 GHz.
Emissions Electromagnetically benign

Mechanical
Terminals Screw clamp for 0.5 to 1.5mm² cables in blue removable terminal block.
Weight 0.4kg

Accessories
Separately powered backlight Orange, powered from 28V 300Ω Zener barrier or galvanic isolator
Loop powered backlight Green; powered from 4/20mA current.
Typeset scale card Blank scale card fitted to each instrument can be supplied typeset with units of measurement.
Tag number Thermally printed tag number on rear of the instrument.

DIMENSIONS (mm)

Recommended panel cut-out
DIN 43 700
92.0 ±0.8/-0.0 x 45 +0.6/-0.0
To achieve an IP65 seal between the instrument and the panel
90 +0.5/-0.0 x 43.5 +0.5/-0.0

TERMINAL CONNECTIONS

HOW TO ORDER

Please specify
Model number BA405C
Display at 4mA XXXX
Display at 20mA XXXX
Include position of decimal point and sign if negative

Accessories
Display backlight
Scale card
Tag strip

Please specify if required
Loop powered backlight or Separately powered backlight
Legend
Legend

06
The BA505C is a panel mounting manual set point station that enables the current flowing in a 4/20mA loop to be manually adjusted from within a process area. The instrument is loop powered and contains a 3½ digit display which may be calibrated to show the 4/20mA current in engineering units.

**Main application** of the BA505C is the adjustment of plant parameters from within a process area. Speed controller set points such as a vessel mixer, actuator position or any parameter represented by a 4/20mA signal can be adjusted by the set point station. The BA505C incorporates a ten turn high resolution potentiometer fitted with a friction damper to minimise the risk of accidental adjustment. The magnitude of the variable being adjusted is shown on a 3½ digit display which may be calibrated in engineering units. An operator can therefore accurately set the process parameter to the required value without the need for any other instruments.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. Set point stations are protected from reverse connection and overrange input current, and incorporate radio frequency filtering to comply with the European EMC Directive.

For applications in flammable atmospheres the BA405C has been certified intrinsically safe and may be installed in most hazardous areas.
### SPECIFICATION

**Output**
- Current: Typ 3.5 to 21mA
- Resistance: Greater than 1M

**Power Supply**
- Voltage: 6.1 to 30V

**Accuracy**
- Control resolution: 0.05% of maximum output
- Temperature effect: Less than 2µA/˚C

**Display**
- Type: 3½ digit
- Zero: Adjustable between -1000 & 1000
- Span: Adjustable between 000 & 1999
- Polarity: Automatic minus sign
- Decimal point: 1 of 3 positions or absent selected by internal plug-in link.

**Environmental**
- Operating temp: -20 to +60 ˚C
- Storage temp: -40 to +85˚C
- Humidity: To 95% at 40˚C non-condensing

**Enclosure**
- Front: IP65
- Rear: IP20

**EMC**

**Immunity**
- Less than 1% of span error for 10V/m field strength between 27MHz & 1 GHz.

**Emissions**
- Electromagnetically benign

**Mechanical**
- Terminals: Screw clamp for 0.5 to 1.5mm² cables in removable terminal block.
- Weight: 0.4kg

**Accessories**
- Separately powered backlight: LED backlight
- Vin: 14 to 30V dc, may be dimmed by reducing voltage below 14V.
- Iin: 40mA typical
- Typeset scale card: Blank scale card fitted to each instrument can be supplied typeset with units of measurement.
- Tag number: Thermally printed tag number on the rear of the instrument.

### DIMENSIONS (mm)

- **Recommended panel cut-out**
  - DIN 43 700
  - 92.0 +0.8/-0.0 x 45 +0.6/-0.0
  - To achieve an IP65 seal between the instrument and the panel
  - 90 +0.5/-0.0 x 43.5 +0.5/-0.0

### TERMINAL CONNECTIONS

Terminals 2 & 4 are internally linked for joining return 4/20mA wire

### HOW TO ORDER

**Model number**
- BA505C

**Display at 4mA XXXX**
- Include position of decimal point and sign if negative

**Display at 20mA XXXX**

**Accessories**
- Display backlight
- Scale card
- Tag strip

**Please specify if required**
- Separately powered backlight
- Legend
- Legend
Field and panel mounting loop powered 4/20mA rate totalisers for use with flowmeters in safe and hazardous areas. Complementing BEKA loop powered indicators, these instruments are easy and inexpensive to install as they require no additional power supply.

The intrinsically safe instruments have ATEX certification allowing installation throughout Europe. The Type nL model also has ATEX certification permitting installation in Zone 2 without barriers or isolators.

Instruments are supplied calibrated to customer requirement free of charge and if requested they can be labeled to show units of measurement, tag number and application.

To select the model for your application, please refer to the summary on the following page.

Also see:
Battery powered pulse input rate totalisers Page 77
Externally powered pulse input rate totalisers Page 83
Select a loop-powered 4/20mA totaliser for your application from:

### Intrinsically safe models

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<td>Panel</td>
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<td>Front IP65 Rear IP20</td>
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<tr>
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<td>Yes</td>
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<tr>
<td>External keypad</td>
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<td>Standard</td>
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### Type nL model

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<td>Mounting</td>
<td>Field</td>
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### General purpose models

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<th>Model</th>
<th>BA554D</th>
<th>BA558C</th>
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<td>External keypad</td>
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The BA354D is a loop-powered, intrinsically safe, field mounting rate totaliser with separate rate and total displays. When connected in series with a 4/20mA flow transmitter, the BA354D will display the rate of flow in engineering units and total flow in the same or different units. The BA354D only introduces a 1V drop which allows it to be installed in almost any 4/20mA loop. If the 4/20mA loop is disconnected, the displayed total and all programme parameters are stored in permanent memory, and are automatically recovered when the 4/20mA current is restored.

Main application of the BA354D is to integrate the 4/20mA output from a flow transmitter and to display the total flow in engineering units. The flow rate is shown on a second smaller display. A selectable root extractor enables the output from a differential flow transmitter to be displayed in linear units. When fitted with optional alarms, the BA354D can detect low or high flow rates and can perform simple flow batching applications.

Intrinsic safety certification to the ATEX Directive allows installation throughout Europe. The 4/20mA input terminals comply with the requirements for simple apparatus enabling the BA354D to be connected in series with most certified intrinsically safe circuits without the need for an additional system certificate. This, together with the very low voltage drop, makes the BA354D easy to apply.

Control and programming of the BA354D is performed via four push-buttons which are protected from damage and tampering behind a sealed cover. For applications requiring frequent adjustment, the instrument can be supplied with an external membrane keypad. All the programme functions are contained in easy to understand menus which may be protected by a user definable security code. Display scaling factors employ floating decimal points to simplify calibration.

An internal calibrator simulates 4 and 20mA input currents so that the instrument may be quickly calibrated without the need for test equipment or disconnection from the 4/20mA loop.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed for high or low operation on either the rate or total displays. Each output is certified as a separate intrinsically safe circuit and complies with the requirements for simple apparatus. Almost any certified intrinsically safe load such as a solenoid valve or sounder may be controlled by these outputs.

Backlighting is available as an option to improve readability when the BA354D is installed in a poorly illuminated area. High efficiency amber LEDs provide an even glow to enhance display contrast. The backlight is powered by a separate Zener barrier or galvanic isolator and does not affect certification of the 4/20mA loop.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection. A separate terminal compartment allows the BA354D to be installed and terminated without exposing the display electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and clamping screws are forward facing. Additional terminals are provided which may be used to link the return 4/20mA conductor and cable screens.
**SPECIFICATION**

**Input**
- Current: 4 to 20mA
- Voltage: Less than 1V at 20°C
- Overrange: ±200mA will not cause damage

**Display**
- Type: Liquid crystal
- Rate –: 5 digits 9.5mm high
- Span: Adjustable between 0 & 20000 for a 4 to 20mA input
- Zero: Adjustable between 0 & 20000 with 4mA input.
- Decimal point: 1 of 4 positions or absent
- Total –: 8 digits 14mm high
- Overrange: ±200mA will not cause damage
- Timebase: Per second, minute or hour
- Scaling factor: Adjustable between 0.0001 & 65535

**Accuracy**
- Rate display at 20°C
  - Linear: ±0.02% of span ±1 digit
  - Root extracting: ±16µA at input ±1 digit
- Temperature effect
  - Zero: Less than 25ppm/°C
  - Span: Less than 50ppm/°C
- Series mode: Less than 0.05% of span error for 1mA rejection
- Total display: Updated every second

**Remote total reset**
- Contact closure with resistance less than 1kΩ

**Intrinsic safety**
- Europe ATEX
  - Standard: EN50020:1994
  - Code: Group II Category 1G, EEx ia IIC T5
  - Certificate number: ITS00ATEX2009
  - Output parameters:
    - Uo: 1.1V
    - Io: 70mA dc
    - Po: 22mW
    - Ceq: 20nF
    - Leq: 10µH
  - Location: Gas Zone 0, 1 or 2; Dust Zone 20, 21 or 22
  - Installation: The BA354D may be connected to any certified intrinsically safe circuit whose output parameters do not exceed:
    - Uo: 30V
    - Io: 200mA
    - Po: 0.85W

**Environmental**
- Operating temp: -20 to 60°C (ATEX gas certification)
- Storage temp: -40 to 90°C
- Enclosure: IP66 see ITS test report C87IV0383A
- EMC: In accordance with EU Directive 89/336/EEC.
- Immunity: Less than 1% of rate span error for 10V/m.
- Emissions: Undetectable above background noise.

**Mechanical**
- Terminals: Screw clamp for 0.5 to 2.5mm² cables.
- Weight: 1.6kg

**Accessories**
- Separately powered backlight
- Alarms: Two independent alarms each of which may be programmed for high or low operation on either the rate or total display with a NC or NO output.
- Outputs: Isolated solid state switch
- On: Less than 5Ω +0.6V
- Off: Greater than 180kΩ
- Membrane keypad enables instrument to be adjusted without removing the control cover.
- Scale legend: Units of measurement marked on display escutcheon.
- Tag legend: Tag number or application information marked on display escutcheon.

**TERMINAL CONNECTIONS**
- **4/20mA input**
  - Terminals 2 & 4 internally linked for joining return 4/20mA wire.
- **Optional external keypad**
- **Separate terminal compartment**
- **Three M20 x 1.5 tapped cable entries**

**HOW TO ORDER**
- **Model number**: please specify
- **Certification**: BA354D
- **ATEX gas & dust**: ATEX gas
- **Rate display**: 4/20mA input
- **Rate display at 4mA**: XXXXX
- **Rate display at 20mA**: XXXXXX
- **Rate timebase**: Seconds, minutes or hours
- **Total scale factor**: (Units of rate display)-(Units of total display)#

**Accessories**
- **Display backlight**: Separately powered backlight
- **Alarms**: Separately powered backlight
- **External keypad**: External keypad
- **Escutcheon marking**: Scale legend required
- **Tag**: Tag legend required
- **Stainless legend plate**: Stainless steel plate secured to front of instrument, etched with tagging or applicational information.

# If calibration information is not supplied, instrument will be set to display rate of 0.00 to 100.00 with a timebase of seconds and a total scale factor of 1

* See accessory datasheet for details

**DIMENSIONS (mm)**

**TAG NUMBER**

**SCALE**

**HOW TO ORDER**

**SPECIFICATION**

**INPUT**
- **Current**: 4 to 20mA
- **Voltage**: Less than 1V at 20°C
- **Overrange**: ±200mA will not cause damage

**DISPLAY**
- **Type**: Liquid crystal
- **Rate –**: 5 digits 9.5mm high
- **Span**: Adjustable between 0 & 20000 for a 4 to 20mA input
- **Zero**: Adjustable between 0 & 20000 with 4mA input.
- **Decimal point**: 1 of 4 positions or absent
- **Total –**: 8 digits 14mm high
- **Overrange**: ±200mA will not cause damage
- **Timebase**: Per second, minute or hour
- **Scaling factor**: Adjustable between 0.0001 & 65535

**ACCURACY**
- **Rate display at 20°C**
  - Linear: ±0.02% of span ±1 digit
  - Root extracting: ±16µA at input ±1 digit
- **Temperature effect**
  - Zero: Less than 25ppm/°C
  - Span: Less than 50ppm/°C
- **Series mode**: Less than 0.05% of span error for 1mA rejection
- **Total display**: Updated every second

**REMOTE TOTAL RESET**
- Contact closure with resistance less than 1kΩ

**INTRINSIC SAFETY**
- **Europe ATEX**
  - **Standard**: EN50020:1994
  - **Code**: Group II Category 1G, EEx ia IIC T5 (Tamb = -40 to 60°C) or Group II Category 1GD, T80°C IP66 EEx ia IIC T5 (Tamb = -20 to 60°C)
  - **Certificate number**: ITS00ATEX2009
  - **Output parameters**
    - **Uo**: 1.1V
    - **Io**: 70mA dc
    - **Po**: 22mW
    - **Ceq**: 20nF
    - **Leq**: 10µH
  - **Location**: Gas Zone 0, 1 or 2; Dust Zone 20, 21 or 22
  - **Installation**: The BA354D may be connected to any certified intrinsically safe circuit whose output parameters do not exceed:
    - **Uo**: 30V
    - **Io**: 200mA
    - **Po**: 0.85W

**ENVIRONMENTAL**
- **Operating temp**: -20 to 60°C (ATEX gas certification)
- **Storage temp**: -40 to 90°C
- **Enclosure**: IP66 see ITS test report C87IV0383A
- **EMC**: In accordance with EU Directive 89/336/EEC.
- **Immunity**: Less than 1% of rate span error for 10V/m.
- **Emissions**: Undetectable above background noise.

**MECHANICAL**
- **Terminals**: Screw clamp for 0.5 to 2.5mm² cables.
- **Weight**: 1.6kg

**ACCESSORIES**
- **Separately powered backlight**: Orange; powered from 28V 300Ω Zener barrier or galvanic isolator.
- **Alarms**: Two independent alarms each of which may be programmed for high or low operation on either the rate or total display with a NC or NO output.
- **Outputs**: Isolated solid state switch
- **On**: Less than 5Ω +0.6V
- **Off**: Greater than 180kΩ
- **Membrane keypad**: Enables instrument to be adjusted without removing the control cover.
- **Scale legend**: Units of measurement marked on display escutcheon.
- **Tag legend**: Tag number or application information marked on display escutcheon.

**TERMINAL CONNECTIONS**
- **4/20mA input**
  - Terminals 2 & 4 internally linked for joining return 4/20mA wire.
- **Optional external keypad**
- **Separate terminal compartment**
- **Three M20 x 1.5 tapped cable entries**

**HOW TO ORDER**
- **Model number**: please specify
- **Certification**: BA354D
- **ATEX gas & dust**: ATEX gas
- **Rate display at 4mA**: XXXXX
- **Rate display at 20mA**: XXXXXX
- **Rate timebase**: Seconds, minutes or hours
- **Total scale factor**: (Units of rate display)-(Units of total display)#

**ACCESSORIES**
- **Display backlight**: Separately powered backlight
- **Alarms**: Separately powered backlight
- **External keypad**: External keypad
- **Escutcheon marking**: Scale legend required
- **Tag**: Tag legend required
- **Stainless legend plate**: Stainless steel plate secured to front of instrument, etched with tagging or applicational information.

* See accessory datasheet for details

# If calibration information is not supplied, instrument will be set to display rate of 0.00 to 100.00 with a timebase of seconds and a total scale factor of 1
The BA354ND is a loop-powered, Type nL certified, field mounting rate totaliser with separate rate and total displays. When connected in series with a 4/20mA flow transmitter, the BA354ND will display the rate of flow in engineering units and total flow in the same or different units. The BA354ND only introduces a 1V drop which allows it to be installed in almost any 4/20mA loop. If the 4/20mA loop is disconnected or the power supply fails, all programme parameters and the displayed total are stored in permanent memory and are automatically recovered when the 4/20mA current is restored.

Main application of the BA354ND is to integrate the 4/20mA output from a flow transmitter and to display the total flow in engineering units. The flow rate is shown on a second smaller display. A selectable root extractor enables the output from a differential flow transmitter to be displayed in linear units. When fitted with optional alarms, the BA354ND can detect high and low flow rates and can perform simple flow batching operations.

An EC Declaration of Conformity demonstrates that the BA354ND complies with the requirements for Group II, Category 3G equipment defined in the ATEX Explosive Atmospheres Directive 94/9/EC. This allows the instrument to be installed in Zone 2 hazardous areas without a Zener barrier or galvanic isolator, and provides a less expensive alternative to intrinsic safety or flameproof instrumentation.

Control and programming of the BA354ND is performed via four push-buttons which are protected from tampering behind a sealed cover. For applications requiring frequent adjustment, the instrument can be supplied with an external membrane keypad. All the programme functions are contained in easy to understand menus which may be protected by a user definable security code. Display scaling factors employ floating decimal points to simplify calibration.

An internal calibrator simulates 4 and 20mA input currents so that the instrument may be quickly calibrated without the need for test equipment or disconnection from the 4/20mA loop.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed for high or low operation on either the rate or total displays. Almost any low voltage certified Type nL load such as a solenoid valve or sounder may be controlled by these outputs.

Backlighting is available as an option to improve readability when the BA354ND is installed in a poorly illuminated area. High efficiency amber LEDs provide an even glow to enhance display contrast. The backlight is a separate Type nL circuit and may be powered from the safe area without a Zener barrier or galvanic isolator.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection. A separate terminal compartment allows the BA354ND to be installed and terminated without exposing the display electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and clamping screws are forward facing. Additional terminals are provided which may be used to link the return 4/20mA conductor and cable screens.
**Input**
Current: 4 to 20mA
Voltage: Less than 1V at 20°C
Overrange: ±200mA will not cause damage.

**Display**
Type: Liquid crystal
Rate: 5 digits 9.5mm high
Span: Adjustable between 0 & 20000 for 4mA input.
Zero: Adjustable between 0 & 20000 with 4mA input.
Decimal point: 1 of 4 positions or absent
Timebase: Per second, minute or hour
Overrange: 4 least significant digits are blanked.
Total: 8 digits 14mm high
Scaling factor: Adjustable between 0.0001 & 65535
Decimal point: 1 of 7 positions or absent
Grand total: Max count 10^16

--- Rate and total can be shown on either display

**Accuracy**
Rate display at 20°C
Linear: ±0.01% of span ±1 digit
Root extracting: ±16µA at input ±1 digit
Temperature effect:
Zero: Less than 25ppm/°C
Span: Less than 50ppm/°C
Series mode: Less than 0.05% of span error for 1mA pk to pk 50Hz or 60Hz signal.
Total display: Updated every second

**Remote total reset**
Contact closure with resistance less than 1kΩ

**Type nL certification**
ATEX
EC-Declaration of Conformity
Code: Group II Category 3G
Location: Zone 2
Certificate number: N0011

**Certificate of Conformity**
Standard: EN50021:1999
Code: EEx nL IIC T5
Certificate number: ITS No. 00Y4017

**Installation**
The BA354ND may be connected in series with any 4/20mA circuit providing maximum current in normal operation is less than 30mA.

**Environmental**
Operating temperature: -20 to 60°C (Certified for use at -40°C)
Storage temp: -40° to 85°C
Enclosure: IP66 see ITS test report C871/V0383A
EMC: In accordance with EU Directive 89/336/EEC.
Immunity: Less than 1% of rate span error for 10V/m.
Emissions: Undetectable above background noise. Class B equipment

**Mechanical**
Terminals: Screw clamp for 0.5 to 2.5mm² cables.
Weight: 1.6kg

**Accessories**
Separately powered backlight
Vin: 18 to 30V dc. May be dimmed by reducing voltage below 18V.
lin: 40mA typical
Alarms: Two independent alarms each of which may be programmed for high or low operation on either the rate or total display with a NC or NO output.
Outputs:
On: Less than 5Ω ±0.6V
Off: Greater than 180kΩ
External keypad: Membrane keypad enables instrument to be adjusted without removing the control cover.
Scale legend: Units of measurement marked onto display escutcheon.
Tag legend: Tag number or applicational information marked on display escutcheon.
Stainless legend plate: Stainless steel plate secured to front of instrument, etched with tagging or applicational information.
Pipe mounting kit: 2 kits are available BA392D and BA393.

--- See accessory datasheet for details

**SPECIFICATION**

**DIMENSIONS (mm)**

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

- **Model number**
  - BA354ND
- **Rate display at 4mA**
  - Include position
- **Rate display at 20mA**
  - XXXXX
- **Rate timebase**
  - Second, minutes or hours
- **Total scale factor**
  - (Units of rate display)-(Units of total display)
- **Accessories**
  - Separately powered backlight
  - Alarms
  - External keypad
  - Escutcheon marking
  - Scale legenda
  - Tag
  - Stainless legend plate
  - Pipe mounting kit
- **please specify**
  - BA392D or BA393

--- If calibration information is not supplied, instrument will be set to display rate of 0.00 to 100.00 with a timebase of seconds and a total scale factor of 1
The BA358C is a loop-powered, intrinsically safe, panel mounting rate totaliser with separate rate and total displays. When connected in series with a 4/20mA flow transmitter, the BA358C will display the rate of flow in engineering units and total flow in the same or different units. The BA358C only introduces a 1V drop which allows it to be installed into almost any 4/20mA loop. If the 4/20mA loop is disconnected, the displayed total and all programme parameters are stored in permanent memory and are automatically recovered when the 4/20mA current is restored.

Main application of the BA358C is to integrate the 4/20mA output from a flow transmitter and to display the total flow in engineering units. The flow rate is shown on a smaller display, although the function of the two displays may be reversed. A selectable root extractor enables the output from a differential flow transmitter to be displayed in linear units. When fitted with optional alarms, the BA358C can detect low or high flow rates and can perform simple flow batching operations.

Intrinsic safety certification to the ATEX Directive allows installation throughout Europe. The 4/20mA input terminals comply with the requirements for simple apparatus enabling the BA358C to be connected in series with most certified intrinsically safe circuits without the need for an additional system certificate. This, together with the low voltage drop makes the BA358C very easy to apply.

Control and programming is performed via the front panel tactile push-buttons which ‘click’ when operated. All the programme functions are contained in easy to understand menus which may be protected by a user definable security code. Display scaling factors employ floating decimal points to simplify calibration.

The front panel is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. A captive neoprene gasket provides an IP65 seal between the enclosure and the panel.

An internal calibrator simulates 4 and 20mA input currents so that the instrument may be quickly calibrated without the need for test equipment or disconnection from the 4/20mA loop.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed for high or low operation on either the rate or total displays. Each output is certified as a separate intrinsically safe circuit and complies with the requirements for simple apparatus. Almost any certified intrinsically safe load such as a solenoid valve or sounder may be controlled by these outputs.

Backlighting is available as an option to improve readability when the BA358C is installed in a poorly illuminated area. High efficiency amber LEDs provide an even glow to enhance display contrast. The backlight is powered by a separate Zener barrier or galvanic isolator and does not affect certification of the 4/20mA loop.
SPECIFICATION

Input
- Current: 4 to 20mA
- Voltage: Less than 1V at 20°C
- Overrange: ±200mA will not cause damage.

Display
- Type: Liquid crystal
- Rate: 5 digits 9.5mm high
- Span: Adjustable between 0 & 20000 for a 4 to 20mA input.
- Zero: Adjustable between 0 & 20000 with 4mA input.
- Decimal point: 1 of 4 positions or absent
- Timebase: Per second, minute or hour
- Overrange: 8 digits 14mm high
- Scaling factor: Adjustable between 0.0001 & 65535
- Decimal point: 1 of 7 positions or absent
- Grand total: Max count 10^8

Accuracy
- Rate display at 20°C:
  - Linear: ±0.02% of span ±1 digit
  - Root extracting: ±16µA at input ±1 digit
- Temperature effect:
  - Zero: Less than 25ppm/°C
  - Span: Less than 50ppm/°C
  - Mode: Less than 0.05% of span error for 1mA
  - Rejection: pk to pk 50Hz or 60Hz signal.
- Total display: Updated every second

Remote total reset
- Contact closure with resistance less than 1kΩ

Intrinsic safety
- Europe ATEX
- Standard: EN50020:1994
- Code: Group II Category 1G EEx ia IIC T5
- Certificate number: ITS00ATEX2010

Output parameters
- Uo: 1.1V
- Io: 70mA dc
- Po: 22mW
- Ceq: 20nF
- Leq: 10µH

Installation
- The BA358C may be connected to any certified intrinsically safe circuit whose output parameters do not exceed:
  - Uo: 30V
  - Io: 200mA
  - Po: 0.85W

Environmental
- Operating temperature: -20 to 60°C (Certified for use at -40°C)
- Storage temp: -40° to 85°C
- Enclosure: Front IP65; rear IP20
- EMC: In accordance with EU Directive 89/336/EEC.
  - Immunity: Less than 1% of rate span error for 10V/m.
  - Emissions: Undetectable above background noise.
  - Class: B equipment

Mechanical
- Terminals: Screw clamp for 0.5 to 1.5mm² cables. Terminal blocks removable.
- Weight: 0.5kg

Accessories
- Separately powered backlight: Orange: powered from 28V 300Ω Zener barrier or galvanic isolator.
- Alarms: Two independent alarms each of which may be programmed for high or low operation on either the rate or total display with a NC or NO output.
- Outputs: Isolated solid state switch
  - On: Less than 5Ω ±0.6V
  - Off: Greater than 180kΩ
  - Certified as simple apparatus
- Typeset scale card: Blank scale card fitted to each instrument, can be supplied typeset with units of measurement.
- Tag number: Thermally printed number or applicational information on rear of instrument.

DIMENSIONS (mm)

TERMINAL CONNECTIONS

HOW TO ORDER

Model number
- please specify
  - BA358C
- Rate display at 4mA
- XXXXX
- Include position
  - Rate display at 20mA
- XXXXX
  - of decimal point #
- Rate timebase
- Seconds, minutes or hours
  - (Units of rate display)+(Units of total display)#
- Total scale factor
- Accessory set
- Display backlight
- Accessories
- Scale card
- Tag number
- please specify
  - Separately powered backlight
  - Alarms
  - Legend required
  - Legend required

# If calibration information is not supplied, instrument will be set to display rate of 0.00 to 100.00 with a timebase of seconds and a total scale factor of 1

* See accessory datasheet for details
The BA554D is a field mounting, loop-powered rate totaliser with separate rate and total displays. When connected in series with a 4/20mA flow transmitter, the instrument will display the rate of flow in engineering units and the total flow in the same or different units. The BA554D only introduces a 1V drop which allows it to be installed in series with almost any 4/20mA loop without the need for an additional power supply. If the 4/20mA loop is disconnected, the displayed total and all programme parameters will be stored in permanent memory, and will be automatically recovered when the 4/20mA current is restored.

Main application of the BA554D is to integrate the 4/20mA output from a flow transmitter and to display the total flow in engineering units. The flow rate is shown on a smaller display, although the function of the two displays may be reversed. When used with a differential flowmeter, a root extracting function may be selected to linearise the input so that both the flow rate and the total flow are displayed in linear engineering units. When fitted with optional alarms, the BA554D can detect low or high flow rates and can perform simple flow batching operations.

Control and programming of the BA554D is performed via four pushbuttons which are protected from tampering behind a sealed cover. For applications requiring frequent adjustment, the instrument can be supplied with an external membrane keypad. All the programme functions are contained in easy to understand menus which may be protected by a user definable security code. To simplify calibration the total scaling factor employs a floating decimal point.

An internal calibrator simulates 4 and 20mA input currents so that the instrument may be quickly calibrated without the need for test equipment or disconnection from the 4/20mA loop.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed for high or low operation on either the rate or total displays.

Backlighting is available as an option to improve readability when the BA554D is installed in a poorly illuminated area. High efficiency amber LEDs provide an even glow to enhance display contrast.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection. A separate terminal compartment allows the BA554D to be installed and terminated without exposing the display electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and clamping screws are forward facing. Additional terminals are provided which may be used to link the return 4/20mA conductor and cable screens.
**SPECIFICATION**

**Input**
- Current: 4 to 20mA
- Voltage: Less than 1V at 20°C
- Overrange: ±200mA will not cause damage.

**Display**
- Type: Liquid crystal
- Rate: 5 digits 9.5mm high
- Span: Adjustable between 0 & 20000 for a 4 to 20mA input.
- Zero: Adjustable between 0 & 20000 with 4mA input.
- Decimal point: 1 of 4 positions or absent
- Timebase: Per second, minute or hour
- Overrange: 4 least significant digits are blanked.
- Total: 8 digits 14mm high
- Decimals point: 1 of 7 positions or absent
- Grand total: Max count 10^8

---Rate and total can be shown on either display

**Accuracy**
- Rate display at 20°C
  - Linear: ±0.02% of span ±1 digit
  - Root extracting: ±16µA at input ±1 digit

**Environmental**
- Operating temperature: -20 to 60°C
- Storage temp: -40° to 85°C
- Enclosure: IP66 see ITS test report C87IV0383A
- EMC: In accordance with EU Directive 89/336/EEC.
- Immunity: Less than 1% of rate span error for 10V/m.
- Emissions: Undetectable above background noise. Class B equipment

**Mechanical**
- Terminals: Screw clamp for 0.5 to 2.5mm² cables.
- Weight: 1.6kg

**Accessories**
- Separately powered backlight: LED backlight
- Vinyl: 18 to 30V dc. May be dimmed by reducing voltage below 18V
- Lin: 40mA typical
- Alarms: Two independent alarms each of which may be programmed for high or low operation on either the rate or total display with a NC or NO output.
- Outputs: Isolated solid state switch
- On: Less than 5Ω +0.6V
- Off: Greater than 180kΩ
- Rating: 30V dc; 250mA
- External keypad: Membrane keypad enables instrument to be adjusted without removing the control cover.
- Scale legend: Units of measurement marked onto display escutcheon.
- Tag legend: Tag number or applicational information marked on display escutcheon.
- Stainless legend plate: Stainless steel plate secured to front of instrument, etched with tagging or applicational information.
- Pipe mounting kit: 2 kits are available BA392D and BA393.

---See accessory datasheet for details

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

**Please specify**
- Model number
  - Rate display at 4mA
  - Rate display at 20mA
  - Timebase
  - Total scale factor
- Accessories
  - Display backlight
  - Alarms
  - External keypad
  - Escutcheon marking
  - Scale
  - Tag
  - Stainless legend plate
  - Pipe mounting kit
- Legend required
- Tag legend required
- Scale legend required

**Pipe mounting kit BA392D or BA393**

---If calibration information is not supplied, instrument will be set to display rate of 0.00 to 100.00 with a timebase of seconds and a total scale factor of 1 **DIMENSIONS (mm)**
The BA558C is a loop-powered, panel mounting rate totaliser with separate rate and total displays. When connected in series with a 4/20mA flow transmitter, the BA558C will display the rate of flow in engineering units and total flow in the same or different units. The BA558C only introduces a 1V drop which allows it to be installed into almost any 4/20mA loop. If the 4/20mA loop is disconnected, the displayed total and all programme parameters are stored in permanent memory, and are automatically recovered when the 4/20mA current is restored.

Main application of the BA558C is to integrate the 4/20mA output from a flow transmitter and to display the total flow in engineering units. The flow rate is shown on a smaller display, although the function of the two displays may be reversed. A selectable root extracting function enables the output from a differential flow transmitter to be displayed in linear units. When fitted with optional alarms, the BA558C can detect high and low flow rates and can perform simple flow batching operations.

Control and programming is performed via the front panel tactile push-buttons which ‘click’ when operated. All the programme functions are contained in easy to understand menus which may be protected by a user definable security code. To simplify calibration the total scaling factor employs a floating decimal point.

The front panel is a robust, easy to clean Noryl moulding IP65 sealed with a non-reflective, scratch resistant polyester membrane. A captive neoprene gasket provides an IP65 seal between the enclosure and the panel.

An internal calibrator simulates 4 and 20mA input currents so that the instrument may be quickly calibrated without the need for test equipment or disconnection from the 4/20mA loop. Although not providing independent verification, this provides an effective way to quickly check performance or to recalibrate.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed for high or low operation on either the rate or total displays. Each output will switch a dc load such as a solenoid valve or a sounber, and the alarm status is shown by a display annunciator.

Backlighting is available as an option to improve readability when the BA558C is installed in a poorly illuminated area. High efficiency amber LEDs provide an even glow to enhance display contrast.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The instrument is protected from reverse connection and overrange input current, and incorporates extensive radio frequency filtering.

If flammable atmospheres are present a BA358C should be used. This has the same features as the BA558C, but has been certified for use in hazardous areas.
**SPECIFICATION**

**Input**
- Current: 4 to 20mA
- Voltage: Less than 1V at 20°C
- Overrange: ±200mA will not cause damage.

**Display**
- Type: Liquid crystal
- Rate: 5 digits, 9.5mm high
- Span: Adjustable between 0 & 20000 for a 4 to 20mA input.
- Zero: Adjustable between 0 & 20000 with 4mA input.
- Decimal point: 1 of 4 positions or absent
- Timebase: Per second, minute or hour
- Overrange: 4 least significant digits are blanked.
- Total: 8 digits, 14mm high
- Scaling factor: Adjustable between 0.0001 & 65535
- Decimal point: 1 of 7 positions or absent
- Grand total: Max count 10^9

--- Rate and total can be shown on either display

**Accuracy**
- Rate display at 20°C
  - Linear: ±0.02% of span ±1 digit
  - Root extracting: ±16µA at input ±1 digit
- Temperature effect
  - Zero: Less than 25ppm/°C
  - Span: Less than 50ppm/°C
  - Series mode: Less than 0.05% of span error for 1mA pk to pk 50Hz or 60Hz signal.
- Total display: Updated every second

**Remote total reset**
Contact closure with resistance less than 1kΩ

**Environmental**
- Operating temperature: -20 to 60°C
- Storage temp: -40° to 85°C
- Enclosure: Front IP65, Rear IP20
- EMC: In accordance with EU Directive 89/336/EEC.
- Immunity: Less than 1% of rate span error for 10V/m.
- Emissions: Undetectable above background noise. Class B equipment

**Mechanical**
- Terminals: Screw clamp for 0.5 to 1.5mm² cables.
- Terminal blocks removable.
- Weight: 0.5kg

**Accessories**
- Separately powered backlight
  - LED backlight
    - Vin: 18 to 30V dc. May be dimmed by reducing voltage below 18V.
    - Iin: 40mA typical
- Alarms
  - Two independent alarms each of which may be programmed for high or low operation on either the rate or total display with a NC or NO output.
- Outputs
  - Isolated solid state switch
  - On: Less than 5kΩ +0.8V
  - Off: Greater than 180kΩ
- Rating: 30V dc, 250mA
- Typeset scale card: Blank scale card fitted to each instrument, can be supplied typeset with units of measurement. *
- Tag number: Thermally printed number or applicational information on rear of instrument. *

**TERMINAL CONNECTIONS**

**Recommended panel cut-out**
DIN 43 700
136.0 ±0.5 / -0.0 x 66.2 ±0.5 / -0.0
To achieve an IP65 seal between the instrument and the panel
136.0 ±0.5/0.0 x 66.2 ±0.5/0.0
Four panel mounting clips must be used

**HOW TO ORDER**

**Please specify**

- Model number: BA558C
- Rate display at 4mA
- Rate display at 20mA
- Rate timebase
- Total scale factor
- Accessories
  - Display backlight
  - Alarms
  - Scale card
  - Tag number

**Legend required**

- Typeset scale card
- Tag number

* See accessory datasheet for details

---

# If calibration information is not supplied, instrument will be set to display rate of 0.00 to 100.00 with a timebase of seconds and a total scale factor of 1

---

06
Two field mounting pulse input rate totalisers powered by long life internal batteries, one has ATEX intrinsic safety certification for use in gas and dust hazardous areas, the other is a general purpose model for safe area applications. Both can be supplied with optional alarms and may be calibrated to show flow rate and total flow in engineering units.

Instruments are supplied calibrated to customer requirements free of charge and if requested they can be labelled to show units of measurement, tag number and application.

To select the model for your application, please refer to the summary on the following page.

Also see:
Loop powered 4/20mA input rate totalisers Page 65
Externally powered pulse input rate totalisers Page 83
Select a battery powered rate totaliser for your application from:

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</tr>
<tr>
<td>External keypad</td>
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</tr>
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Visit our website: www.beka.co.uk
The BA344D is a battery powered, intrinsically safe, rate totaliser with separate rate and total displays. An accumulated grand total may also be displayed. The instrument will count switch contact closures, open collector, voltage pulses and the low level output from magnetic pick-offs.

Main application of the BA344D is to process the pulse output from a hazardous area flowmeter, and to display the rate of flow and the total flow in the same or different engineering units. The instrument may be used with any flowmeter having a pulse output proportional to flow rate, such as a turbine flow meter. The instrument is battery powered and requires no external supply, it is therefore ideal for use in remote areas where cable installation would be difficult or expensive. When fitted with optional alarms, the BA344D will perform simple flow batching applications.

Control and programming of the BA344D is performed via four push-buttons which are protected from damage and tampering behind a sealed cover. For applications requiring frequent adjustment, the instrument can be supplied with a robust external membrane keypad. All the programme functions are contained in easy to understand menus which may be protected by a user definable security code. To simplify calibration the rate and total scaling factors employ floating decimal points.

ATEX intrinsic safety certification allows installation in gas and dust hazardous areas. The voltage input terminals comply with the requirements for simple apparatus and may be connected to almost any certified magnetic pick-off or voltage pulse source. Switch contacts and open collector inputs may also be connected to the BA344D.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed for high or low operation on either the rate or total displays. Each output is certified as a separate intrinsically safe circuit and complies with the requirements for simple apparatus. Almost any intrinsically safe certified load such as a solenoid valve or sounder may be controlled by these outputs.
**SPECIFICATION**

**Input**
- Switch contact—
  - Closed: Less than 100Ω
  - Open: Greater than 1kΩ
- Magnetic pick-off: 40mV peak to peak typical
- Voltage pulse
  - Low: Less than 1V
  - High: Greater than 3V; 30V max
- Open collector—
  - Closed: Less than 2kΩ
  - Open: Greater than 10kΩ

**Frequency**
- Switch contact: 0.01Hz to 100Hz
- Other inputs: 0.01Hz to 5kHz max

**Note:** For maximum battery life use a normally open contact or a normally off transistor.

**Display**
- Type: Liquid crystal
- Rate †: 6 digits 9.5mm high
- Decimal point: 1 of 5 positions or absent
- Total †: 8 digits 14mm high
- Decimal point: 1 of 7 positions or absent
- Grand total: Max count 10⁰

† Rate or total can be shown on either display

**Internal battery**
- Life: Continuous totalising
  - Up to 5 years; depends upon input type and frequency, display update rate and whether optional alarms are fitted and activated.

**Programmable reset**
- Contact closure with resistance less than 1kΩ

**Programmable functions**
- Total dividing scale factor: Adjustable between 0.001 & 99999999
- Rate dividing scale factor: Adjustable between 0.001 & 99999999
- Rate timebase: Rate may be displayed per second, minute or hour.
- Rate display filter: Adjustable digital filter

**Intrinsic safety**
- Europe ATEX
  - Standard: EN50020:1994
  - Code: Group II Category 1G, Ex ia IIC T5
    - (Tamb = -40 to 50˚C)
  - or T80˚C IP66 Ex ia IIC T5
    - (Tamb = -20 to 50˚C)
- Certificate number:
  - Group II Category 1GD, EEx ia IIC T80˚C IP66
  - ITS01ATEX2017
- Location:
  - Gas Zone 0, 1 or 2
  - Dust Zone 20, 21 or 22

**Environmental**
- Operating temperature: -20 to 50˚C (ATEX gas certification -40˚ to 50˚C)
- Storage temp: -40˚ to 85˚C
- Enclosure: IP66 see ITS test report C87IV0383A
- EMC: In accordance with EU Directive 89/336/EEC.
- Immunity: Less than 1% of rate span error at 10V/m
- Emissions: Undetectable above background noise
- Class B equipment

**Mechanical**
- Terminals: Screw clamp for 0.5 to 2.5mm² cables.
- Weight: 1.7kg

**Accessories**
- Alarms: Two independent alarms each of which may be programmed for high or low operation with NC or NO output.
- Outputs:
  - On: Isolated solid state switch
  - Off: Less than 5Ω +0.6V
  - Certified as simple apparatus
- External keypad: Membrane keypad enables instrument to be adjusted without removing the control cover.

**Input Type**
- Rate scaling factor: XXXXXXX #
- Total scaling factor: XXXXXXX #
- Rate timebase: Seconds, minutes or hours #

**Accessories**
- Alarms: Please specify
- External keypad: Please specify
- Escutcheon marking: Scale legend required
- Tag: Tag legend required
- Stainless legend plate: BA392D or BA393
- Pipe mounting kit: 2 kits are available BA392D and BA393.

* See accessory datasheet for details

**TERMINAL CONNECTIONS**

**DIMENSIONS (mm)**

**HOW TO ORDER**

Model number: please specify
- BA344D
  - ATEX gas
  - ATEX gas & dust
  - FM & ATEX gas

Certification: please specify
- Group II Category 1G, Ex ia IIC T5
- or T80˚C IP66 Ex ia IIC T5
- ITS01ATEX2017

Input:
- Type: Please specify
- Rate scaling factor: XXXXXXX #
- Total scaling factor: XXXXXXX #
- Rate timebase: Seconds, minutes or hours #

Accessories:
- Alarms: Please specify
- External keypad: Please specify
- Escutcheon marking: Scale legend required
- Tag: Tag legend required
- Stainless legend plate: BA392D or BA393
- Pipe mounting kit: BA395
- Stem mounting kit: BA491 battery unit

# If calibration information is not supplied, instrument will be set for open collector input, with rate timebase of seconds, rate scaling factor of 1 and total scaling factor of 1.
The BA544D is a battery powered rate totaliser with separate rate and total displays. An accumulated grand total may also be displayed. The instrument will count switch contact closures, voltage pulses and the low level output from magnetic pick-offs.

Main application of the BA544D is to process the pulse output from a flowmeter, and to display the rate of flow and the total flow in the same or different engineering units. The instrument may be used with any flowmeter having a pulse output proportional to flow rate, such as a turbine flow meter. The instrument is battery powered and requires no external supply, it is therefore ideal for use in remote areas where cable installation would be difficult or expensive. When fitted with optional alarms, the BA544D will perform simple flow batching operations.

The BA544D may also be used as a tachometer to measure the speed of rotating machinery.

Control and programming of the BA544D is performed via four pushbuttons which are protected from damage and tampering behind a sealed cover. For applications requiring frequent adjustment, the instrument can be supplied with a robust external membrane keypad. All the programme functions are contained in easy to understand menus which may be protected by a user definable security code. To simplify calibration the rate and total scaling factors employ floating decimal points.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection, and a separate terminal compartment allows the BA544D to be installed and terminated without exposing the display electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and clamping screws are forward facing.

Battery life can be up to five years, but depends upon the type and frequency of the input signal and the instrument function. To maximise battery life, the BA544D may be programmed to only update the display every twenty seconds, this does not degrade readability as operating any pushbutton will temporarily increase the display update rate to twice per second for thirty seconds. The display includes a low battery warning annunciator which will be activated a few months before the battery is exhausted. If the battery is not replaced, the displayed total and all programme parameters will be automatically stored in the permanent internal memory before the BA544D stops functioning. These parameters will be recovered when a new battery is installed.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed for high or low operation on either the rate or total displays.

Internal battery lasts for up to 5 years

Magnetic pick-off, switch contact, open collector or voltage pulse input

Separate rate and total displays

IP66 enclosure for surface or pipe mounting

Optional: Alarms External keypad

3 year guarantee
## Specification

### Input
- **Switch contact**
  - Closed: Less than 100Ω
  - Open: Greater than 1kΩ
- **Magnetic pick-off**: 40mV peak to peak typical
- **Voltage pulse**
  - Low: Less than 1V
  - High: Greater than 3V; 30V max
- **Open collector**
  - Closed: Less than 2kΩ
  - Open: Greater than 10kΩ
- **Frequency**
  - Switch contact: 0.01Hz to 100Hz
  - Other inputs: 0.01Hz to 5kHz max

*Note: For maximum battery life use a normally open contact or a normally off transistor.*

### Display
- **Type**: Liquid crystal
- **Rate**: 6 digits, 9.5mm high
- **Decimal point**: 1 of 5 positions or absent
- **Total**: 8 digits, 14mm high
- **Decimal point**: 1 of 7 positions or absent
- **Grand total**: Max count $10^n$

† Rate or total can be shown on either display

### Internal Battery
- **Life**: Continuous totalising
- **Continuous totalising**: Up to 5 years; depends upon input type and frequency, display update rate and whether optional alarms are fitted and activated.

### Remote Total Reset
- **Contact closure with resistance less than 1kΩ**

### Programmable Functions
- **Total dividing scale factor**: Adjustable between 0.001 & 99999999
- **Rate dividing scale factor**: Adjustable between 0.001 & 99999999
- **Rate timebase**: Rate may be displayed per second, minute or hour.
- **Rate display filter**: Adjustable digital filter
- **Security**: Two levels of security are selectable

### Environmental
- **Operating temp**: -20 to 60˚C
- **Storage temp**: -40˚ to 85˚C
- **Enclosure**: IP66 see ITS test report C87IV0383A
- **EMC**: In accordance with EU Directive 89/336/EEC.
- **Immunity**: Less than 1% of rate span error at 10V/m
- **Emissions**: Undetectable above background noise. Class B equipment

### Mechanical
- **Terminals**: Screw clamp for 0.5 to 2.5mm² cables.
- **Weight**: 1.7kg

### Accessories
- **Alarms**: Two independent alarms each of which may be programmed for high or low operation with NC or NO output.
- **Outputs**: Isolated solid state switch
  - On: Less than 5Ω +0.6V
  - Off: Greater than 180kΩ
- **Rating**: 30V dc: 250mA
- **External keypad**: Membrane keypad enables instrument to be adjusted without removing the control cover.
- **Scale legend**: Units of measurement marked onto display escutcheon.
- **Tag legend**: Tag number or applicational information marked onto display escutcheon.
- **Stainless legend plate**: Stainless steel plate secured to front of instrument, etched with tagging or applicational information.
- **Pipe mounting kit**: 2 kits are available BA392D and BA393.

*See accessory datasheet for details*

### How to Order
- **Model number**: BA544D
- **Input Type**: Please specify
- **Rate scaling factor**: XXXXXXX #
- **Total scaling factor**: XXXXXXX #
- **Rate timebase**: Seconds, minutes or hours #
- **Accessories**: Please specify
- **Alarms**: Alarms
- **External keypad**: External keypad
- **Escutcheon marking**: Scale, Tag
- **Stainless legend plate**: Pipe mounting kit
- **Replacement battery**: BA491 battery unit

# If calibration information is not supplied, instrument will be set for open collector input, with rate timebase of seconds, rate scaling factor of 1 and total scaling factor of 1.
Field and panel mounting rate totalisers that can process and display the pulse output from flowmeters in safe and hazardous areas.

The intrinsically safe instruments have ATEX and FM certification allowing hazardous area installation throughout Europe and the USA. The Type nL model has ATEX certification permitting installation in Zone 2 without barriers or isolators and the intrinsically safe models have FM nonincendive approval allowing installation in Division 2 without barriers or isolators.

All models are supplied calibrated to customer requirements free of charge and if requested they can be labelled to show units of measurement, tag number and application.

To select the instrument for your application, please refer to the summary on the following page.

Also see:
- Loop powered 4/20mA input rate totalisers Page 65
- Battery powered pulse input rate totalisers Page 77

### Intrinsically safe

#### Type nL

- Proximity detector, voltage pulse, switch contact, magnetic pick-off or open collector input.
- Field and panel mounting models
- Separate rate and total displays
- Optional: Display backlight
- Alarms
- Pulse output
- 4/20mA output

### General purpose

- Proximity detector, voltage pulse, switch contact, magnetic pick-off or open collector input.
- Field and panel mounting models
- Separate rate and total displays
- Optional: Display backlight
- Alarms
- Pulse output
- 4/20mA output

---

**Totalisateurs avec alimentation externe**

Les totalisateurs en montage encastré et de site peuvent recevoir et afficher des impulsions provenant de débitmètres en zones saines ou à risques. Les instruments pour zones à risques sont certifiés ATEX et FM permettant leur utilisation aussi bien en Europe qu’aux Etats-Unis. Le type nL est certifié ATEX pour une installation en zone 2 sans barrières ou isolateurs.

**Mengenzähler/ Durchflussanzeige externe Versorgung**


**Totalizadores con alimentación externa**

Totalizadores para montaje en panel o en campo que pueden procesar y mostrar las salidas de impulsos de los fluímetros tanto en zona peligrosa como en zona segura. Los instrumentos intrínsecamente seguros tienen certificación ATEX y FM permitiendo su instalación en Zonas con peligro de explosión de acuerdo a las normativas Europea y Americana. El modelo Tipo nL tiene certificación ATEX permitiendo su instalación en Zona 2 sin utilizar barreras o aisladores.
Select an externally powered pulse input totaliser for your application from:

### Intrinsically safe models

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<tr>
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### Type nL model

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### General purpose models

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<tr>
<td>4/20mA output</td>
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<td>Yes</td>
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</table>
The BA334D is an externally powered, intrinsically safe rate totaliser with separate rate and total displays which will operate from a switch contact, voltage pulse, magnetic pick-off, open collector or a proximity detector input. A novel adaptive measuring technique plus an adjustable digital filter ensure that optimum rate display stability and step response can be achieved over a wide input frequency range.

**Main application** of the BA334D is to process the pulse output from a hazardous area flowmeter and to display the rate of flow and the total flow in the same or different engineering units. Either rate or flow may be shown on the large display. The instrument may be used with any flowmeter having a pulse output proportional to flow rate, such as a turbine flow meter. When fitted with optional alarms, the instrument can perform simple flow batching applications. Optional pulse and 4/20mA outputs enable the rate totaliser to operate remote counters and analogue instruments.

**Control and programming** of the BA334D is performed via four push-buttons which are protected from damage and tampering behind a sealed cover. For applications requiring frequent adjustment, the instrument can be supplied with a robust external membrane keypad. All the programme functions are contained in easy to understand menus which may be protected by a user definable security code. To simplify calibration the rate and total scaling factors employ floating decimal points.

**Intrinsic safety certification** allows installation in most hazardous areas, separate versions are available with ATEX gas and ATEX gas plus dust certifications allowing installation throughout Europe. For applications in the USA, a new version having FM intrinsic safety and nonincendive approvals has recently been introduced.

**The enclosure**, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection. A separate terminal compartment allows the BA334D to be installed and terminated without exposing the display electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and clamping screws are forward facing.

**Backlighting** is available as an option to improve readability when the BA334D is installed in a poorly illuminated area. High efficiency amber LEDs provide an even glow to enhance display contrast.

**Optional alarms** provide two galvanically isolated solid state outputs which may be independently programmed for high or low operation on either the rate or total displays. Each output is certified as a separate intrinsically safe circuit and complies with the requirements for simple apparatus. Almost any hazardous area certified load such as a solenoid valve or sounder may be controlled by these outputs.

**The optional 4/20mA output** is isolated and complies with the requirements for intrinsic safety simple apparatus allowing connection to a wide range of Zener barriers and galvanic isolators. It may be programmed to produce an analogue output proportional to any part of the rate display, thus making the BA334D an effective hazardous area pulse to 4/20mA converter.
**SPECIFICATION**

**Power supply**
- **Voltage**
  - The BA334D must be powered via a Zener barrier or galvanic isolator. 10V min between terminals 1 and 2.
- **Current**
  - 12mA max., plus proximity detector current when used.

**Input**
- **Switch contact**
  - Less than 100Ω
- **Closed**
  - Greater than 1kΩ
- **Open**
  - Greater than 1mΩ
- **Proximity detector**
  - 2-wire NAMUR
- **Magnetic pick-off**
  - 40mV peak to peak typical
- **Voltage pulse**
  - Less than 1V
- **Low**
  - Greater than 3V; 30V max
- **High**
  - Less than 2kΩ
- **Open collector**
  - Greater than 10kΩ
- **Closed**
  - Less than 100Ω
- **Frequency**
  - Switch contact
  - 0.01Hz to 100Hz
  - Other inputs
  - 0.01Hz to 5kHz max

**Display**
- **Type**
  - Liquid crystal
- **Rate**
  - 6 digits 9.5mm high
- **Total**
  - 8 digits 14mm high
- **Grand total**
  - Max count 10
- **Display backlighting**
  - LED backlight powered from 28V, 93mA

**Remote reset**
- Contact closure with resistance less than 1kΩ

**Programmable functions**
- **Total dividing scale factor**
  - Adjustable between 0.001 & 99999999
- **Rate dividing scale factor**
  - Adjustable between 0.001 & 99999999
- **Rate display filter**
  - Adjustable digital filter

**Intrinsic safety**
- **Europe ATEX**
  - Standard
    - Group II Category 1G, EXe ia IIC T5
    - or
    - Group II Category 1GD, T80˚C IP66
  - **Certificate number**
    - IT301ATEX2001
  - **Location**
    - Gas Zone 0, 1 or 2
    - Dust Zone 20, 21 or 22
  - **USA FM**
    - Option, see How to order
  - **Code**
    - CL I, II, III, Div 1: GP A, B, C, D, E, F & G
    - T4 @ 60˚C
    - File 3022309
  - **Standard**
    - Nonincendive
    - CL I, II, III, Div 2: GP A, B, C & D, T4 @ 60˚C
    - File 3022309

**Environmental**
- **Operating temperature**
  - -20 to 60˚C (Certified for use at -40˚C)
- **Storage temp**
  - -40˚ to 85˚C
- **Enclosure**
  - IP66 IT5 test report C87IV0383A available
- **EMC**
  - In accordance with EU Directive 89/336/EEC.
  - **Immunity**
    - Less than 1% of rate span error at 10V/m
  - **Emissions**
    - Undetectable above background noise.
  - **Class B equipment**

**Mechanical**
- **Terminals**
  - Screw clamp for 0.5 to 2.5mm² cables.
- **Weight**
  - 1.6kg

**Accessories**
- **Display backlighting**
  - LED backlight powered from 28V, 93mA
- **Alarms**
  - Two independent alarms each of which may be programmed for high or low operation with NC or NO output.
  - **Outputs**
    - Isolated solid state switch
    - On Less than 52 +0.6V
    - Off Greater than 1800Ω
    - **Certified as simple apparatus.**
  - **Re-transmitted pulse**
    - Isolated, certified as simple apparatus.
  - **4/20mA output**
    - Isolated current sink, certified as simple apparatus
    - **Voltage drop**
      - 5V max.

**DIMENSIONS (mm)**

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

**Model number**
- **please specify**
  - BA334D
- **ATEX gas**
  - ATEX gas & dust
- **FM & ATEX gas**
  - for FM & ATEX models

**Input**
- **Rate scaling factor**
  - XXXXXXX #
- **Total scaling factor**
  - XXXXXXX #
- **Rate timebase**
  - Seconds, minutes or hours #

**Accessories**
- **please specify**
  - Backlight
  - Alarms
  - Pulse output
  - 4/20mA output
  - External keypad
  - Escutcheon marking
  - Scale
  - Tag
  - Stainless legend plate
  - Pipe mounting kit

**Note:** Cable entries differ for FM & ATEX models

* See accessory datasheet for details
The BA334ND is an externally powered, Type nL certified rate totaliser with separate rate and total displays which will operate from a switch contact, voltage pulse, magnetic pick-off, open collector or a proximity detector input. A novel adaptive measuring technique plus an adjustable digital filter ensure that optimum rate display stability and step response can be achieved over a wide input frequency range.

Main application of the BA334ND is to process the pulse output from a flowmeter in a Zone 2 hazardous area and to display the rate of flow and the total flow in the same or different engineering units. The instrument may be used with any flowmeter having a pulse output proportional to flow rate, such as a turbine flow meter. When fitted with optional alarms, the instrument can perform simple flow batching applications. Optional pulse and 4/20mA outputs enable the rate totaliser to operate remote counters and analogue instruments.

Control and programming of the BA334ND is performed via four push-buttons which are protected from damage and tampering behind a sealed cover. For applications requiring frequent adjustment, the instrument can be supplied with a robust external keypad. All the programme functions are contained in easy to understand menus which may be protected by a user definable security code. To simplify calibration the rate and total scaling factors employ floating decimal points.

An EC Declaration of Conformity demonstrates that the BA334ND complies with the requirements for Group II, Category 3G equipment defined in the ATEX Explosive Atmospheres Directive 94/9/EC. This allows the instrument to be installed in Zone 2 without the need for Zener barriers or galvanic isolators, thus providing a cost effective alternative to intrinsically safe or flameproof equipment.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection. A separate terminal compartment allows the BA334ND to be installed and terminated without exposing the display electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and clamping screws are forward facing.

Backlighting is available as an option to improve display readability when the BA334ND is installed in a poorly illuminated area. High efficiency amber LEDs provide an even glow to enhance display contrast. The backlight is a separate Type nL circuit and may be powered from the safe area without a Zener barrier or galvanic isolator.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed for high or low operation on either the rate or total displays. Almost any low voltage certified Type nL load, such as a solenoid valve or sounder, may be controlled.

The optional 4/20mA output is isolated and may be programmed to produce an analogue output proportional to any part of the rate display, thus making the BA334ND an effective hazardous area...
**SPECIFICATION**

**Power supply**
- Voltage: 10 to 30V dc
- Current: 12mA max., plus proximity detector current when used.

**Input**
- Switch contact
  - Closed: Less than 100Ω
  - Open: Greater than 1kΩ
- Proximity detector
  - 2-wire NAMUR
- Magnetic pick-off
  - Low: Less than 1V
  - High: Greater than 3V, 30V max
- Open collector
  - Closed: Less than 2kΩ
  - Open: Greater than 10kΩ
- Frequency
  - Switch contact: 0.01Hz to 100Hz
  - Other inputs: 0.01Hz to 5kHz max

**Display**
- Type: Liquid crystal
  - Rate: 6 digits 9.5mm high
  - Decimal point: 1 of 5 positions or absent
  - Total: 8 digits 14mm high
  - Decimal point: 1 of 7 positions or absent
- Grand total: Max count 10

**Remote reset**
- Contact closure with resistance less than 1kΩ.

**Programmable functions**
- Total dividing scale factor: Adjustable between 0.001 & 99999999
- Rate dividing scale factor: Adjustable between 0.001 & 99999999
- Rate timebase: Rate may be displayed per second, minute or hour.
- Rate display filter: Adjustable digital filter

**Type nL certification**
- ATEX
- EC-Declaration of Conformity
  - Code: Group II, Category 3G
  - Location: Zone 2
  - Certificate number: N0012
- Certificate of Conformity
  - Standard: EN50021
  - Code: ExII1IC T5
  - Certificate number: ITS No. Ex01Y4014

**Environmental**
- Operating temperature: -20 to 60°C (Certified for use at -40°C)
- Storage temp: -40° to 85°C
- Enclosure: IP66 see ITS test report C87IV0383A
- EMC: In accordance with EU Directive 89/336/EEC.
- Emissions: Undetectable above background noise. Class B equipment

**Mechanical**
- Terminals: Screw clamp for 0.5 to 2.5mm² cables.
- Weight: 1.6kg

**Accessories**
- Display backlight: LED backlight
- Vin: 18 to 30V dc: May be dimmed by reducing voltage below 18V.
- lin: 40mA typical
- Alarms: Two independent alarms each of which may be programmed for high or low operation with NC or NO output.
- Outputs: Isolated solid state switch
  - On: Less than 5Ω +0.6V
  - Off: Greater than 180kΩ
- Re-transmitted pulse
  - Width: Isolated pulse sink
    - On: Less than 600 +3V
    - Off: Greater than 1mA
  - Rating: 30V dc: 10mA
- 4/20mA output
  - Voltage drop: Isolated current sink
    - 5V max
  - External keypad: Membrane keypad enables instrument to be adjusted without removing the control cover.
- Scale legend: Units of measurement marked onto display escutcheon.
- Tag legend: Tag number or applicational information marked onto display escutcheon.

**DIMENSIONS (mm)**

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

**Model number**
- Please specify BA334ND

**Input**
- Type: XXXXXX #

**Rate scaling factor**
- Total scaling factor: XXXXXX #

**Rate timebase**
- Seconds, minutes or hours #

**Accessories**
- Please specify
  - Backlight: Off
  - Alarms: Off
  - Re-transmitted pulse output: Off
  - 4/20mA output: Off
  - External keypad: External keypad
  - Escutcheon marking: Scale
  - Stainless legend plate: Tag

**How to Order**

1. If calibration information is not supplied, instrument will be set for open collector input with rate timebase of seconds, rate scaling factor of 1 and total scaling factor of 1.

2. See accessory datasheet for details.

3. Pipe mounting kit: 2 kits are available BA392D and BA393.
The BA338C is an externally powered, intrinsically safe rate totaliser with separate rate and total displays which will operate from a switch contact, voltage pulse, magnetic pick-off, open collector or a proximity detector input. A novel adaptive measuring technique plus an adjustable digital filter ensure that optimum rate display stability and step response can be achieved over a wide input frequency range.

Main application of the BA338C is to process the pulse output from a hazardous area flowmeter, and to display the rate of flow and the total flow in the same or different engineering units. The instrument may be used with any flowmeter having a pulse output proportional to flow rate, such as a turbine flow meter. When fitted with optional alarms, the instrument can perform simple flow batching applications.

Control and programming is performed via the front panel tactile push-buttons which ‘click’ when operated. All the programme functions are contained in easy to understand menus which may be protected by a user definable security code. Display scaling factors employ floating decimal points to simplify calibration.

The front panel is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. A captive neoprene gasket provides an IP65 seal between the enclosure and the panel.

ATEX intrinsic safety certification permits installation in all gas hazardous areas throughout Europe. The voltage input terminals 3 & 4 comply with the requirements for simple apparatus allowing direct connection to most certified magnetic pick-offs and voltage pulse sources. FM intrinsic safety and non-incendive approvals allow the BA338C to be used in the USA.

Backlighting is available as an option to improve readability when the BA338C is installed in a poorly illuminated area. High efficiency amber LEDs provide an even glow to enhance display contrast.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed for high or low operation on either the rate or total displays. Each output is certified as a separate intrinsically safe circuit and complies with the requirements for simple apparatus. Almost any hazardous area certified load such as a solenoid valve or sounder may be controlled by these outputs.

The optional 4/20mA output is isolated and complies with the requirements for intrinsic safety simple apparatus allowing connection to a wide range of Zener barriers and galvanic isolators. It may be programmed to produce an analogue output proportional to any part of the rate display, thus making the BA338C an effective hazardous area pulse to 4/20mA converter.
Power supply
- Voltage: The BA338C must be powered via a Zener barrier or galvanic isolator. 10V min between terminals 1 and 2.
- Current: 12mA max., plus proximiter detector currents when used.

Input
- Switch contact:
  - Closed: Less than 100Ω
  - Open: Greater than 1kΩ
- Proximity detector: 2-wire NAMUR
- Magnetic pick-off: 40mV peak to peak typical
- Voltage pulse:
  - Low: Less than 1V
  - High: Greater than 3V; 30V max
- Open collector:
  - Closed: Less than 2kΩ
  - Open: Greater than 10kΩ
- Frequency:
  - Switch contact: 0.01Hz to 100Hz
  - Other outputs: 0.01Hz to 5kHz max

Display
- Type: Liquid crystal
- Rate:
  - Decimal point: 1 of 5 positions or absent
- Total:
  - 8 digits 14mm high
  - 1 of 7 positions or absent
- Grand total:
  - Max count 10^9

Remote reset: Contact closure with resistance less than 1kΩ.

Programmable functions
- Total dividing scale factor: Adjustable between 0.001 & 99999999
- Rate dividing scale factor: Adjustable between 0.001 & 99999999
- Rate timebase: Rate may be displayed per second, minute or hour.
- Rate display filter: Adjustable digital filter

Intrinsic safety
- Europe ATEX:
  - Standard: EN50020:1994
  - Code: Group II, Category 1G, EEx ia IIC T5
  - Certificate number: ITS01ATEX2002
- USA FM:
  - Standard:
    - Nonincendive: 3611
      - Code: CL I; Div 2; GP A, B, C & D
      - Temperature: T4 @ 60°C
    - Nonincendive: 3611
      - Code: CL I; Div 1; GP A, B, C & D
      - Temperature: T4 @ 60°C
  - File No: 3022309

Environmental
- Operating temperature: -20 to 60°C (Certified for use at -40°C)
- Storage temp: -40° to 85°C
- Enclosure: Front IP65 Rear IP20
- EMC: In accordance with EU Directive 89/336/EEC.
- Immunity: Less than 1% of rate span error at 10V/m
- Emissions: Undetectable above background noise.
- Class B equipment

Mechanical
- Terminals: Screw clamp for 0.5 to 1.5mm² cables.
- Weight: 0.6kg

Accessories
- Alarms: Two independent alarms each of which may be programmed for high or low operation with NC or NO output.
- Outputs:
  - Isolated solid state switch
  - On: Less than 5Ω/0.6V
  - Off: Greater than 180kΩ
- Display backlight: LED backlight powered from 28V 93mA
- Zener barrier or galvanic isolator.
- Re-transmitted pulse: Isolated, certified as simple apparatus.
- 4/20mA output: Isolated current sink, certified as simple apparatus
- Voltage drop: 5V max.
- Typeset scale card: Blank scale card fitted to each instrument, can be supplied typeset with units of measurement.
- Tag number: Thermally printed number or application information on rear of instrument.

Recommended panel cut-out
- DIN 43 700
- 138.0 ±1.0° -0.0 x 68.0 ±0.7° -0.0
- To achieve an IP65 seal between the instrument and the panel
- 136.0 ±0.5° -0.0 x 66.2 ±0.5° -0.0
- Four panel mounting clips must be used

Terminal cut-out

Terminals for options shown in outline

How to order
- Model number: please specify
- Input: BA338C
- Type: XXXXXXX
- Rate scaling factor: #
- Total scaling factor: XXXXXXX
- Rate timebase: Seconds, minutes or hours #
- Accessories:
  - please specify
    - Alarms: Backlight
    - Display backlight: Pulse output
    - Re-transmitted pulse output: 4/20mA output
    - 4/20mA output: Legend required
    - Scale card: Legend required
- Tag number: Legend required

* See accessory datasheet for details

# If calibration information is not supplied, instrument will be set for open collector input with rate timebase of seconds, rate scaling factor of 1 and total scaling factor of 1.
The BA534D is an externally powered rate totaliser with separate rate and total displays which will operate from a switch contact, voltage pulse, magnetic pick-off, open collector or a proximity detector input. A novel adaptive measuring technique plus an adjustable digital filter ensure that optimum rate display stability and step response can be achieved over a wide input frequency range.

Main application of the BA534D is to process the pulse output from a flowmeter and to display the rate of flow and the total flow in the same or different engineering units. The instrument may be used with any flowmeter having a pulse output proportional to flow rate, such as a turbine flowmeter. When fitted with optional alarms, the instrument can perform simple flow batching applications. Optional pulse and 4/20mA outputs enable the rate totaliser to operate remote counters and analogue instruments.

Control and programming of the BA534D is performed via four push-buttons which are protected from damage and tampering behind a sealed cover. For applications requiring frequent adjustment, the instrument can be supplied with a robust external membrane keypad. All the programme functions are contained in easy to understand menus which may be protected by a user definable security code. To simplify calibration the rate and total scaling factors employ floating decimal points.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection. A separate terminal compartment allows the BA534D to be installed and terminated without exposing the display electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and clamping screws are forward facing.

Backlighting is available as an option to improve readability when the BA534D is installed in a poorly illuminated area. High efficiency amber LEDs provide an even glow to enhance the display contrast.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed for high or low operation on either the rate or total displays. Each output will switch a dc load such as a solenoid valve or sounder, and the status of each alarm is indicated by a display annunciator.

If flammable atmospheres are present the BA334D should be used. This has the same features as the BA534D, but has been certified intrinsically safe for use in hazardous areas.
**SPECIFICATION**

**Power supply**
- Voltage: 10 to 30V dc
- Current: 12mA max., plus proximity detector current when used.

**Input**
- **Switch contact**
  - Closed: Less than 100Ω
  - Open: Greater than 1kΩ
- **Proximity detector**
  - 2-wire NAMUR
- **Voltage pulse**
  - Low: Less than 1V
  - High: Greater than 3V; 30V max
- **Open collector**
  - Closed: Less than 2kΩ
  - Open: Greater than 10kΩ
- **Frequency**
  - Switch contact: 0.01Hz to 100Hz
  - Other inputs: 0.01Hz to 5kHz max

**Display**
- **Type**
  - Liquid crystal
- **Rate**
  - 6 digits 9.5mm high
- **Decimal point**
  - 1 of 5 positions or absent
- **Total**
  - 8 digits 14mm high
- **Decimal point**
  - 1 of 7 positions or absent
- **Grand total**
  - Max count 10^*
  - Rate or total can be shown on either display

**Remote reset**
- Contact closure with resistance less than 1kΩ

**Programmable functions**
- **Total dividing scale factor**
  - Adjustable between 0.001 & 99999999
- **Rate dividing scale factor**
  - Adjustable between 0.001 & 99999999
- **Rate timebase**
  - Rate may be displayed per second, minute or hour.
- **Rate display filter**
  - Adjustable digital filter

**Environmental**
- **Operating temperature**
  - -20 to 60˚C
- **Storage temp**
  - -40 to 85˚C
- **Enclosure**
  - IP66 see ITS test report C87IV0383A
- **EMC**
  - In accordance with EU Directive 89/336/EEC.
  - Immunity: Less than 1% of rate span error at 10V/m
  - Emissions: Undetectable above background noise.

**Mechanical**
- **Terminals**
  - Screw clamp for 0.5 to 2.5mm² cables.
  - Weight: 1.6kg

**Accessories**
- **Alarms**
  - Two independent alarms each of which may be programmed for high or low operation with NC or NO output.
  - **Outputs**
    - Isolated solid state switch
    - On: Less than 5Ω ±0.6V
    - Off: Greater than 180kΩ
    - Rating: 30Vdc: 250mA
  - **Display backlighting**
    - LED backlight
    - Vin: 18 to 30V dc. May be dimmed by reducing voltage below 18V.
    - In: 40mA typical
  - **Re-transmitted pulse**
    - Isolated pulse sink
    - On: Adjustable 0.5 to 50ms
    - Off: Greater than 1μs
    - Rating: 30Vdc: 10mA
  - **4/20mA output**
    - Galvanically isolated current sink
    - Voltage drop: 5V max
  - **External keypad**
    - Membrane keypad enables instrument to be adjusted without removing the control cover.
  - **Scale legend**
    - Units of measurement marked onto display escutcheon.
  - **Tag legend**
    - Tag number or applicational information marked onto display escutcheon.
  - **Stainless legend plate**
    - Stainless steel plate secured to front of the instrument, etched with tagging or applicational information.
  - **Pipe mounting kit**
    - 2 kits are available BA392D and BA393.

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

<table>
<thead>
<tr>
<th>Model number</th>
<th>please specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>Type</td>
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<tr>
<td>Rate scaling factor</td>
<td>XXXXXXX #</td>
</tr>
<tr>
<td>Total scaling factor</td>
<td>XXXXXXX #</td>
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<tr>
<td>Rate timebase</td>
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<tr>
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<td>Re-transmitted pulse output</td>
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<tr>
<td>External keypad</td>
<td>4/20mA output</td>
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<td>Escutcheon marking</td>
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<td>Tag legend required</td>
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<tr>
<td></td>
<td>Legend required</td>
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<td></td>
<td>BA392D or BA393</td>
</tr>
</tbody>
</table>

# If calibration information is not supplied, instrument will be set for open collector input with rate timebase of seconds, rate scaling factor of 1 and total scaling factor of 1.

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*See accessory datasheet for details*
The BA538C is an externally powered rate totaliser with separate rate and total displays which will operate from a switch contact, voltage pulse, magnetic pick-off, open collector or a proximity detector input. A novel adaptive measuring technique plus an adjustable digital filter ensure that optimum rate display stability and step response can be achieved over a wide input frequency range.

Main application of the BA538C is to process the pulse output from a flow meter and to display the rate of flow and the total flow in the same or different engineering units. The instrument may be used with any flowmeter having a pulse output proportional to flow rate, such as a turbine flowmeter. When fitted with optional alarms, the instrument can perform simple flow batching applications. Optional pulse and 4/20mA outputs enable the rate totaliser to operate remote counters and analogue instruments.

Control and programming is performed via the front panel tactile push-buttons which 'click' when operated. All the programme functions are contained in easy to understand menus which may be protected by a user definable security code. Display scaling factors employ floating decimal points to simplify calibration.

The front panel is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. A captive neoprene gasket provides an IP65 seal between the enclosure and the panel.

Backlighting is available as an option to improve readability when the BA538C is installed in a poorly illuminated area. High efficiency amber LEDs provide an even glow to enhance display contrast.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed for high or low operation on either the rate or total displays. Each output will switch a dc load such as a solenoid valve or sounder, and the status of each alarm is indicated by a display annunciator.

The optional 4/20mA output is isolated and may be programmed to produce an analogue output proportional to any part of the rate display, thus making the BA538C an effective pulse to 4/20mA converter.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The instrument is protected from overrange and reverse connection and incorporates extensive radio frequency filtering.

If flammable atmospheres are present the BA338C should be used. This has the same features as the BA538C, but has been certified intrinsically safe for use in hazardous areas.
Power supply
Voltage 10 to 30V dc
Current 12mA max., plus proximity detector current when used.

Input
Switch contact
Closed Less than 100Ω
Open Greater than 1kΩ
Proximity detector 2-wire NAMUR
Magnetic pick-off 40mV peak to peak typical
Voltage pulse
Low Less than 1V
High Greater than 3V; 30V max
Open collector
Closed Less than 2kΩ
Open Greater than 10kΩ
Frequency
switch contact
0.01Hz to 100Hz
other inputs 0.01Hz to 5kHz max

Display
Type Liquid crystal
Rate ~ 6 digits 9.5mm high
Decimal point 1 of 5 positions or absent
Total ~ 8 digits 14mm high
Decimal point 1 of 7 positions or absent
Grand total Max count 10^9
-Rate or total can be shown on either display

Remote reset
Contact closure with resistance less than 1kΩ.

Programmable functions
Total dividing scale factor Adjustable between 0.001 & 99999999
Rate dividing scale factor Adjustable between 0.001 & 99999999
Rate timebase Rate may be displayed per second, minute or hour.
Rate display filter Adjustable digital filter

Environmental
Operating temperature -20 to 60˚C
Storage temp -40˚ to 85˚C
EMC In accordance with EU Directive 89/336/EEC.
Immunity Less than 1% of rate span error at 10V/m
Emissions Undetectable above background noise.

Mechanical
Terminals Screw clamp for 0.5 to 1.5mm² cables.
Weight 0.6kg

Accessories
Alarms Two independent alarms each of which may be programmed for high or low operation with NC or NO output.
Outputs Isolated solid state switch
On Less than 5Ω ≤0.6V
Off Greater than 100kΩ
Rating 30Vdc: 250mA
Display backlight LED backlight
Vin 18 to 30V dc May be dimmed by reducing voltage below 18V.
lin 40mA typical
Re-transmitted pulse output Isolated pulse sink
Width Adjustable 0.5 to 50ms
On Less than 60Ω
Off Greater than 1MΩ
Rating 30Vdc: 10mA
4/20mA output Galvanically isolated current sink
Voltage drop 5V max.
Typeset scale card Blank scale card fitted to each instrument, can be supplied typeset with units of measurement.
Tag number Thermally printed number or applicational information on rear of instrument.*

Remote reset
Contact closure with resistance less than 1kΩ.

Programmable functions
Total dividing scale factor Adjustable between 0.001 & 99999999
Rate dividing scale factor Adjustable between 0.001 & 99999999
Rate timebase Rate may be displayed per second, minute or hour.
Rate display filter Adjustable digital filter

Environmental
Operating temperature -20 to 60˚C
Storage temp -40˚ to 85˚C
EMC In accordance with EU Directive 89/336/EEC.
Immunity Less than 1% of rate span error at 10V/m
Emissions Undetectable above background noise.

Mechanical
Terminals Screw clamp for 0.5 to 1.5mm² cables.
Weight 0.6kg

Accessories
Alarms Two independent alarms each of which may be programmed for high or low operation with NC or NO output.
Outputs Isolated solid state switch
On Less than 5Ω ≤0.6V
Off Greater than 100kΩ
Rating 30Vdc: 250mA
Display backlight LED backlight
Vin 18 to 30V dc May be dimmed by reducing voltage below 18V.
lin 40mA typical
Re-transmitted pulse output Isolated pulse sink
Width Adjustable 0.5 to 50ms
On Less than 60Ω
Off Greater than 1MΩ
Rating 30Vdc: 10mA
4/20mA output Galvanically isolated current sink
Voltage drop 5V max.
Typeset scale card Blank scale card fitted to each instrument, can be supplied typeset with units of measurement.
Tag number Thermally printed number or applicational information on rear of instrument.*

* See accessory datasheet for details

** SPECIFICATION **

** DIMENSIONS (mm) **

Recommended panel cut-out
DIN 43 700
138.0 ±1.0/ -0.0 x 68.0 ±0.7/-0.0
To achieve an IP65 seal between the instrument and the panel
136.0 ±0.5/0.0 x 66.2 ±0.5/0.0
Four panel mounting clips must be used

** TERMINAL CONNECTIONS **

** HOW TO ORDER **

Model number please specify
Input BA38B
Rate scaling factor Type XXXXXXX #
Total scaling factor XXXXXX #
Rate timebase Seconds, minutes or hours #

Accessories
Alarms
Display backlight
Re-transmitted pulse output
4/20mA output
Scale card
Legend required
Tag number
Legend required

# If calibration information is not supplied, instrument will be set for open collector input with rate timebase of seconds, rate scaling factor of 1 and total scaling factor of 1.
A unique collection of ATEX & FM certified intrinsically safe instruments which perform a wide variety of counting and timing functions in gas and dust hazardous areas. In addition to pulse counting and time interval measurement or control, these instruments can also display rotational speed and position from quadrature signals.

The intrinsically safe models are supplemented by a field mounting Type nL instrument which will perform the same functions in Zone 2 hazardous areas without the need for Zener barriers or galvanic isolators.

Also included in this section is the BA369 intrinsically safe battery powered clock. Featuring an easy to read accurate digital display, this stand-alone clock can display local time in any gas hazardous area.

To select the model for your application, please refer to the summary on the following page.
Select an externally powered counter, timer, tachometer and clock for your application from:

### Intrinsically safe models

<table>
<thead>
<tr>
<th>Model</th>
<th>BA364D</th>
<th>BA368C</th>
</tr>
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<tbody>
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<td><strong>Page no.</strong></td>
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<td>101</td>
</tr>
<tr>
<td><strong>Mounting</strong></td>
<td>Field</td>
<td>Panel</td>
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<tr>
<td><strong>Certification</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>ATEX Group II, Category 1G or ATEX Group II, Category 1GD</td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>FM Class 3610 Intrinsic Safety and Class 3611 Nonincendive</td>
<td></td>
</tr>
<tr>
<td><strong>Protection</strong></td>
<td>IP66</td>
<td>Front IP65</td>
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<tr>
<td></td>
<td></td>
<td>Rear IP20</td>
</tr>
<tr>
<td><strong>Options</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarms</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Backlight</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Pulse output</td>
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<tr>
<td>4/20mA output</td>
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<tr>
<td>External keypad</td>
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<td>Standard</td>
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### Type nL model

<table>
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<tr>
<th>Model</th>
<th>BA364ND</th>
</tr>
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<tbody>
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<tr>
<td><strong>Mounting</strong></td>
<td>Field</td>
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<tr>
<td><strong>Certification</strong></td>
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<tr>
<td>Europe</td>
<td>ATEX Group II, Category 3G EEx nL IIC T5</td>
</tr>
<tr>
<td><strong>Protection</strong></td>
<td>IP66</td>
</tr>
<tr>
<td><strong>Options</strong></td>
<td></td>
</tr>
<tr>
<td>Alarms</td>
<td>Yes</td>
</tr>
<tr>
<td>Backlight</td>
<td>Yes</td>
</tr>
<tr>
<td>Pulse output</td>
<td>Yes</td>
</tr>
<tr>
<td>4/20mA output</td>
<td>Yes</td>
</tr>
<tr>
<td>External keypad</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Battery powered clock:

### Intrinsically safe model

<table>
<thead>
<tr>
<th>Model</th>
<th>BA369</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Page no.</strong></td>
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<tr>
<td><strong>Mounting</strong></td>
<td>Panel</td>
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<tr>
<td><strong>Certification</strong></td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>ATEX Group II, Category 1G EEx ia IIC T5</td>
</tr>
<tr>
<td><strong>Protection</strong></td>
<td>Front IP66</td>
</tr>
<tr>
<td></td>
<td>Rear IP20</td>
</tr>
</tbody>
</table>
The BA364D is an intrinsically safe multi-function instrument which may be programmed to perform a host of counting and timing functions. Easy to use menus allow the instrument to be configured as a counter, timer, tachometer or as a clock. Both of the inputs will operate from 2-wire proximity detectors, switch contacts, magnetic pick-offs, open collectors or voltage pulses. Optional alarm/control outputs further extend the many applications.

Counting may be from one or both inputs. The pulses at each input can be added to, or subtracted from each other, and the result may be scaled to provide a display in engineering units. Alternatively, pulses on one input can increment or decrement the total count depending upon the state of the other input. From two inputs electrically 90˚ out of phase (quadrature), the BA364D can display the direction of movement and position of a shaft or a cable. The total display may be reset to zero via the instrument controls or by a remote contact closure.

As a timer the BA364D may be started and stopped by one or both inputs or from the instrument push-buttons. Elapsed or remaining time may be displayed in hours, minutes and seconds, or in just hours and minutes. When fitted with optional control outputs the instrument can control any process which is required to operate for a fixed time.

Rotational speed may be measured using the tachometer function which will display revolutions per second, minute or per hour. The instrument contains a run-time counter which can show the total operating time of the monitored machinery on the second display. When fitted with optional alarms, over and under speed warnings can be generated.

Configuration as a digital clock enables time to be displayed in twelve or twenty four hour format within a hazardous area. The instrument may operate as a stand-alone clock, or may be synchronised via the reset terminals with an external reference. Two optional control outputs enable hazardous or safe area loads to be turned on and off at preset times twice in each twelve or twenty four hour period.

Control and programming of the BA364D is performed via four push-buttons which are protected from damage and tampering behind a sealed cover. For applications requiring frequent adjustment, the instrument can be supplied with a robust external membrane keypad. All the programme functions are contained in easy to understand menus which may be protected by a user definable security code. To simplify calibration the scaling factors employ floating decimal points.

Intrinsic safety certification allows installation in most hazardous areas, separate versions are available with ATEX gas and ATEX gas plus dust certification allowing installation throughout Europe. For applications in the USA, a new version having FM intrinsic safety and nonincendive approvals has recently been introduced.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection. A separate terminal compartment allows the BA364D to be installed and terminated without exposing the display electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and clamping screws are forward facing.

Backlighting is available as an option to improve readability when the BA364D is installed in a poorly illuminated area. High efficiency amber LEDs provide an even glow to enhance display contrast.

Optional alarm/control outputs provide two galvanically isolated solid state outputs each of which is a separate intrinsically safe circuit and complies with the requirements for simple apparatus. Almost any certified intrinsically safe load such as a solenoid valve or sounder may be controlled by these outputs.

Free of charge programming and calibration to customers requirements is performed prior to despatch, although the BA364D can easily be reconfigured on-site without the need for any test equipment or programming aids.
**SPECIFICATION**

**Power supply**
- Voltage: The BA364D must be powered via a Zener barrier or galvanic isolator.
- Current: 12mA max., plus proximity detector currents when used.

**Inputs A and B**
- Switch contact: Closed, Less than 100Ω; Open, Greater than 1kΩ.
- Proximity detector: 40V peak to peak typical.
- Magnetic pick-off: Less than 1V.
- Voltage pulse: Less than 2kΩ.
- Low, Greater than 20V, 30V max.
- High, Greater than 10kΩ.

**Environmental**
- Frequency: 100Hz max. Reduced to 2kHz for quadrature input.
- Display: 5kHz max. Reduced to 2kHz for quadrature input.
- Telemetry: 9kHz max. Reduced to 2kHz for quadrature input.

**Programmable functions**
- Counter: A; A+B or A-B, A direction controlled by B.
- Total scale factor: Adjustable between 0.001 & 99999999.
- Grand total: 10^15 max count.
- Rate scale factor: Adjustable between 0.001 & 99999999.
- Timer: Elapsed time displayed as h:mm:ss or h:mm.
- Tachometer: Revolutions displayed per sec, per min or per hour.
- Run-time display: Resolution 1/10 hour.
- Clock: Set time displayed in 24 or 12 hour format. Once per 24 or 12 hours.

**Intrinsic safety**
- Europe ATEX: Group I Category 1G, EEx ia IIC T5 (Tamb = -20 to 60˚C).
- USA FM: Standard 3610 Entity; File 3022309.

**Operating conditions**
- Operating temperature: -20 to 60˚C (ATEX version: -40 to 60˚C).
- Storage temperature: -40 to 85˚C.
- IP66 or equivalent IP protection.

**Mechanical**
- Terminals: Screw clamp for 0.5 to 2.5mm^2 cables.
- Weight: 1.6kg.

**Accessories**
- Alarms/control outputs: Two independent outputs.
- Display backlighting: LED backlight powered from 28V 300Ω.
- Re-transmitted pulse: Pulse sink certified as simple apparatus.

**Display**
- Type: Liquid crystal.
- Primary: 8 digits 14mm high.
- Secondary: 6 digits 9.5mm high.
- Decimal point: 1 of 5 positions or absent.

**Remote reset**
- Contact closure with resistance less than 1kΩ.

**How to order**
- Model number: please specify.
- Certification: BA364D or BA392D.
- Configuration inputs: Counter; timer; tachometer or clock.
- Calibration information: Dust option, see How to order.
- Accessories: Alarms, pulse output.
- Pipe mounting kit: 2 kits are available BA392D and BA393.

**How to order**
- Model number: please specify.
- Certification: BA364D or BA392D.
- Configuration inputs: Counter; timer; tachometer or clock.
- Calibration information: Dust option, see How to order.
- Accessories: Alarms, pulse output.
- Scale legend: Units of measurement marked onto display escutcheon.
- Stainless steel plate: Stainless steel plate secured to front of instrument, etched with tagging or applicational information.

**DIMENSIONS (mm)**

**TERMINAL CONNECTIONS**

- 4/20mA output: Galvanically isolated current sink.
- External keypad: Membrane keypad enables instrument to be adjusted without removing the control cover.
- Scale legend: Units of measurement marked onto display escutcheon.
- Stainless steel plate: Stainless steel plate secured to front of instrument, etched with tagging or applicational information.
- Pipe mounting kit: 2 kits are available BA392D and BA393.

Note: Cable entries differ for FM & ATEX models.

**HOW TO ORDER**

- Model number: please specify.
- Certification: BA364D or BA392D.
- Configuration inputs: Counter; timer; tachometer or clock.
- Calibration information: Dust option, see How to order.
- Accessories: Alarms, pulse output.
- Pipe mounting kit: 2 kits are available BA392D and BA393.

### If calibration information is not supplied, instrument will be conditioned as a counter: input A + input B, for open collector inputs; rate & total scale factors of 1.
The BA364ND is a Type nL certified multi-function instrument which may be programmed to perform a host of counting and timing functions. Easy to use menus allow the instrument to be configured as a counter, timer, tachometer or as a clock. Both of the inputs will operate from 2-wire proximity detectors, switch contacts, magnetic pick-offs, open collectors or voltage pulses. Optional alarm/control outputs further extend the many applications.

Counting may be from one or both inputs. The pulses at each input can be added to, or subtracted from each other, and the result may be scaled to provide a display in engineering units. Alternatively, pulses on one input can increment or decrement the total count depending upon the state of the other input. From two inputs electrically 90° out of phase (quadrature), the BA364ND can display the direction of movement and position of a shaft or a cable. The total display may be reset to zero via the instrument controls or by a remote contact closure.

As a timer the BA364ND may be started and stopped by one or both inputs or from the instrument push-buttons. Elapsed or remaining time may be displayed in hours, minutes and seconds, or in just hours and minutes. When fitted with optional control outputs the instrument can control any process which is required to operate for a fixed time.

Rotational speed may be measured using the tachometer function which will display revolutions per second, minute or per hour. The instrument contains a run-time counter which can show the total operating time of the monitored machinery on the second display. When fitted with optional alarms, over and under speed warnings can be generated.

Configuration as a digital clock enables time to be displayed in twelve or twenty four hour format within a Zone 2 hazardous area. The instrument may operate as a stand-alone clock, or may be synchronised via the reset terminals with an external reference. Two optional control outputs enable hazardous or safe area loads to be turned on and off at pre-set times twice in each twelve or twenty four hour period.

Control and programming of the BA364ND is performed via four push-buttons which are protected from damage and tampering behind a sealed cover. For applications requiring frequent adjustment, the instrument can be supplied with a robust external membrane keypad. All the programme functions are contained in easy to understand menus which may be protected by a user definable security code. To simplify calibration the scaling factors employ floating decimal points.

An EC Declaration of Conformity demonstrates that the BA364ND complies with requirements for Group II, Category 3G equipment defined in the ATEX Explosive Atmospheres Directive 94/9/EC. This allows the instrument to be installed in Zone 2 without the need for Zener barriers or galvanic isolators, thus providing a cost effective alternative to intrinsically safe or flameproof equipment.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection. A separate terminal compartment allows the BA364ND to be installed and terminated without exposing the display electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and clamping screws are forward facing.

Backlighting is available as an option to improve display readability when the BA364ND is installed in a poorly illuminated area. High efficiency amber LEDs provide an even glow to enhance display contrast. The backlight is a separate Type nL circuit and may be powered from the safe area without a Zener barrier or galvanic isolator.

Optional alarms/control outputs provide two isolated solid state outputs which may be independently programmed. Almost any low voltage Type nL certified load such as a solenoid valve or sounder may be controlled. A separate 8 digit and 6 digit displays

Two inputs

Group II, Category 3G ATEX certification

IP66 enclosure for surface, pipe or stem mounting

Optional:
Display backlight
Alarms
Pulse and 4/20mA outputs
External keypad

3 year guarantee

BEKA associates Ltd. Old Charlton Rd.
Hitchin, Hertfordshire, SG5 2DA, U.K.
Tel. (01462) 438301 Fax (01462) 453971
e-mail sales@beka.co.uk www.beka.co.uk
### SPECIFICATION

**Power supply**
- Voltage: 10 to 30V dc
- Current: 12mA max., plus proximity detector current when used.

**Inputs A and B**
- Switch contact:
  - Closed: Less than 100Ω
  - Open: Greater than 1kΩ
- Proximity detector: 2-wire NAMUR
- Magnetic pick-off: 40mV peak to peak typical
- Voltage pulse:
  - Low: Less than 1V
  - High: Greater than 3V; 30V max
- Open collector:
  - Closed: Less than 2kΩ
  - Open: Greater than 10kΩ
- Frequency:
  - Switch contact: 100Hz max
  - Other inputs: 5kHz max. Reduced to 2kHz for quadrature input

**Display**
- Type: Liquid crystal
- Primary: 8 digits 14mm high; 1 of 7 positions or absent; colons for h:m:s
- Secondary: 6 digits 9.5mm high; 1 of 5 positions or absent; colons for hh:mm:ss

**Remote reset**
- Contact closure with resistance less than 1kΩ

**Programmable functions**
- Counter:
  - A, A+B or A-B
  - A direction controlled by B
  - A and B Quadrature (90° out of phase)
  - Total scale factor: Adjustable between 0.001 & 99999999
  - Grand total: 10^6 max count
  - Rate scale factor: Adjustable between 0.001 & 99999999
- Timer:
  - Elapsed time displayed as hh:mm:ss or hh/mm
  - Maximum duration: 99 hours/59 minutes: 59 seconds
  - Direction: Up or down
- Tachometer:
  - Revolutions displayed per sec, per min or per hour
  - Rate scale factor: Adjustable between 0.001 & 99999999
  - Run time display: Resolution 1/10 hour
- Clock:
  - Set time displayed in 24 or 12 hour format.
  - External synchronisation: Once per 12 or 24 hours

**Type nL certification**
- ATEX
- EC-Declaration of Conformity
  - Code: Zone 2
  - Certificate number: N0013
  - Certificate of Conformity Standard: EN50021
  - Code: EX nL IIC T5
  - Certificate number: ITS No.01Y4015

**Environmental**
- Operating temperature: -20 to 60°C (Certified for use at -40°C)
- Storage temperature: -40 to 85°C
- Enclosure: IP66
- EMC: In accordance with EU Directive 89/336/EEC.
- Immunity: Less than 1% error at 10V/m
- Emissions: Undetectable above background noise.

**Mechanical**
- Terminals: Screw clamp for 0.5 to 2.5mm² cables.
- Weight: 1.6kg

**Accessories**
- Alarms/control outputs:
  - Two independent outputs
  - Isolated solid state switch
  - On: Less than 5Ω +0.6V
  - Off: Greater than 180kΩ
- Display backlighting:
  - LED backlight powered from 18 to 30V dc supply
- Re-transmitted pulse:
  - Width: Adjustable 0.5 to 50ms
  - On: Less than 60Ω +3V
  - Off: Greater than 1MΩ
  - 4/20mA output:
    - Voltage drop: 5V max
    - External keypad: Membrane keypad enables instrument to be adjusted without removing the control cover.

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### DIMENSIONS (mm)

![Dimension Diagram]

**TERMINAL CONNECTIONS**

![Terminal Connections Diagram]

**Scale legend**
- Units of measurement marked onto display escutcheon.

**Tag legend**
- Tag number or applicational information marked onto display escutcheon.

**Stainless legend plate**
- Stainless steel plate secured to front of instrument, etched with tagging or applicational information.

**Pipe mounting kit**
- 2 kits are available BA392D and BA393.

---

### HOW TO ORDER

- **Model number**
- **Configuration**
- **Inputs**
- **Calibration information**
  - Please specify
    - Counter; timer; tachometer or clock.
    - Proximity detector; switch contact; magnetic pick-off, open collector or voltage pulse.
    - Settings required

**Accessories**
- **Display backlight**
- **Alarms/control outputs**
- **Re-transmitted pulse output**
- **4/20mA output**
- **External keypad**
- **Escutcheon marking**
  - Scale
  - Tag
  - Stainless legend plate
  - Pipe mounting kit

**Scale legend required**
- Tag legend required
- Legend required
- BA364ND or BA393

* If calibration information is not supplied, instrument will be conditioned as a counter; input A + input B; for open collector inputs; rate & total scale factors of 1.

---

### HOW TO ORDER

- **Model number**
- **Configuration**
- **Inputs**
- **Calibration information**
  - Please specify
    - Counter; timer; tachometer or clock.
    - Proximity detector; switch contact; magnetic pick-off, open collector or voltage pulse.
    - Settings required

**Accessories**
- **Display backlight**
- **Alarms/control outputs**
- **Re-transmitted pulse output**
- **4/20mA output**
- **External keypad**
- **Escutcheon marking**
  - Scale
  - Tag
  - Stainless legend plate
  - Pipe mounting kit

**Scale legend required**
- Tag legend required
- Legend required
- BA364ND or BA393

* If calibration information is not supplied, instrument will be conditioned as a counter; input A + input B; for open collector inputs; rate & total scale factors of 1.
The BA368C is an intrinsically safe multi-function instrument which may be programmed to perform a host of counting and timing functions. Easy to use menus allow the instrument to be configured as a counter, timer, tachometer or as a clock. Both of the inputs will operate from 2-wire proximity detectors, switch contacts, magnetic pick-offs, open collector or voltage pulses. Optional alarm/control outputs further extend the many applications.

**Counting** may be from one or both inputs. The pulses at each input can be added to, or subtracted from each other, and the result may be scaled to provide a display in engineering units. Alternatively, pulses on one input can increment or decrement the total count depending upon the state of the other input. From two inputs electrically 90° out of phase (quadrature), the BA368C can display the direction of movement and position of a shaft or a cable. The total display may be reset to zero via the instrument controls or by a remote contact closure.

**As a timer** the BA368C may be started and stopped by one or both inputs or from the instrument push-buttons. Elapsed or remaining time may be displayed in hours, minutes and seconds, or in just hours and minutes. When fitted with optional control outputs the instrument can control any process which is required to operate for a fixed time.

**Rotational speed** may be measured using the tachometer function which will display revolutions per second, minute or per hour. The instrument contains a run-time counter which can show the total operating time of the monitored machinery on the second display. When fitted with optional alarms, over and under speed warnings can be generated.

**Configuration as a digital clock** enables time to be displayed in twelve or twenty four hour format within a hazardous area. The instrument may operate as a stand-alone clock, or may be synchronised via the reset terminals with an external reference. Two optional control outputs enable hazardous or safe area loads to be turned on and off at pre-set times twice in each twelve or twenty four hour period.

**Control and programming** of the BA368C is performed via four front panel tactile push-buttons which ‘click’ when operated. All the programme functions are contained in easy to understand menus which may be protected by a user definable security code. To simplify calibration the scaling factors employ floating decimal points.

**The front panel** is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. A captive neoprene gasket provides an IP65 seal between the enclosure and the panel.

**ATEX intrinsic safety certification** permits installation in all gas hazardous areas throughout Europe. The two inputs may be connected to a wide range of certified sensors and all the outputs are separate galvanically isolated intrinsically safe circuits. FM intrinsic safety and non-intrusive approvals allow the BA368C to be installed in the USA.

**Backlighting** is available as an option to improve readability when the BA368C is installed in poorly illuminated areas. High efficiency amber LEDs provide an even glow to enhance display contrast.

**Optional alarms/control outputs** provide two galvanically isolated solid state outputs each of which is a separate intrinsically safe circuit and complies with the requirements for simple apparatus. Almost any certified intrinsically safe load such as a solenoid valve or switch may be controlled by these outputs.

**Pulse and 4/20mA outputs** may be provided as an option to operate remote equipment. Each output is galvanically isolated and certified as a separate intrinsically safe circuit.

**Free of charge programming** and calibration to customers requirements is performed prior to despatch, although the BA368C can easily be reconfigured on-site without the need for any test equipment or programming aids.
Power supply
Voltage
Current
Inputs A and B
Switch contact
Open
Proximity detector
Magnetic pick-off
Voltage pulse
Low
High
Open collector
Closed
Open
Frequency
switch contact
other inputs
Display
Type
Primary
Decimal point
Secondary
Decimal point
Remote reset
Programmable functions
Counter
A, A+B or A-B; A direction controlled by B
A and B Quadrature (90° out of phase)
Total scale factor
Adjustable between 0.001 & 99999999
Grand total
10⁻¹ max count
Rate scale factor
Adjustable between 0.001 & 99999999
Timer
Elapsed time displayed as hh:mm:ss or hh:mm
Maximum duration
99 hours:59 minutes: 59 seconds
Direction
Up or down
Tachometer
Revolutions displayed per sec, per min or per hour.
Rate scale factor
Adjustable between 0.001 & 99999999
Clock
Set time displayed in 24 or 12 hour format.
External synchronisation
Intrinsic safety
Europe ATEX
Standard EN50020:1994
Code Group II, Category 1G EEx ia IIC T5
Certificate number IT501ATEX2004
Location Zone 0, 1 or 2
USA FM
Standard 3610 Entity CL I; Div 1; GP A, B, C & D
File No 302309
Standard 3611 Nonincendive
CL I; Div 2; GP A, B, C & D
File No 3022309
Operating temperature -20 to 60°C (Certified for use at -40°C)
Storage temperature -40 to 85°C
Enclosure Front IP65, rear IP20
EMC Immunity
In accordance with EU Directive 89/336/EEC.
Less than 1% error at 10V/m
Undetectable above background noise.
Class B equipment
Mechanical
Terminals
Screw clamp for 0.5 to 1.5mm² cables.
0.6kg
Accessories
Alarms/control outputs
Two independent outputs.
Outputs
Isolated solid state switch
On
Less than 5Ω < 0.6V
Off
Greater than 180kΩ
Certified as simple apparatus
Display backlighting
LED backlight powered from 28V 300Ω
Zener barrier or galvanic isolator.
Re-transmitted pulse
Pulse sink certified as simple apparatus
4/20mA output
Galvanically isolated current sink 5V max
Display backlighting
LED backlight powered from 28V 300Ω
Zener barrier or galvanic isolator.
Re-transmitted pulse
Pulse sink certified as simple apparatus
4/20mA output
Galvanically isolated current sink 5V max
SPECIFICATION
DIMENSIONS (mm)
Recommended panel cut-out
DIN 43 700
138.0 +1.0/- 0.0 x 68.0 +0.7/-0.0
To achieve an IP65 seal between the instrument and the panel
136.0 +0.5/-0.0 x 66.2 +0.5/-0.0
Four panel mounting clips must be used
TERMINAL CONNECTIONS
HOW TO ORDER
Re-transmitted pulse output
For 4/20mA output
Scale card
Legend required
Tag number
Legend required
Calibration information
Settings required
# If calibration information is not supplied, instrument will be conditioned as a counter; input A + input B; for open collector inputs; rate & total scale factors of 1.

Model number
BA368C
Configuration
Counter; timer; tachometer or clock.
Inputs
Proximity detector; switch contact; magnetic pick-off, open collector or voltage pulse.

Alarms/control outputs
Alarms
Backlight
Accessories
please specify
Re-transmitted pulse output
4/20mA output
Scale card
Legend required
Tag number
Legend required

Display
Backlight
Accessories
please specify
Re-transmitted pulse output
4/20mA output
Scale card
Legend required
Tag number
Legend required

# If calibration information is not supplied, instrument will be conditioned as a counter; input A + input B; for open collector inputs; rate & total scale factors of 1.

Alarms/control outputs
Two independent outputs.

Display backlighting
LED backlight powered from 28V 300Ω
Zener barrier or galvanic isolator.

Accessories
please specify
Model number
 BA368C
Configuration
 Counter; timer; tachometer or clock.

Inputs
Proximity detector; switch contact; magnetic pick-off, open collector or voltage pulse.

Alarms/control outputs
Alarms
Backlight
Accessories
please specify
Re-transmitted pulse output
4/20mA output
Scale card
Legend required
Tag number
Legend required

# If calibration information is not supplied, instrument will be conditioned as a counter; input A + input B; for open collector inputs; rate & total scale factors of 1.

Alarms/control outputs
Two independent outputs.

Display backlighting
LED backlight powered from 28V 300Ω
Zener barrier or galvanic isolator.

Accessories
please specify
Model number
 BA368C
Configuration
 Counter; timer; tachometer or clock.

Inputs
Proximity detector; switch contact; magnetic pick-off, open collector or voltage pulse.

Alarms/control outputs
Alarms
Backlight
Accessories
please specify
Re-transmitted pulse output
4/20mA output
Scale card
Legend required
Tag number
Legend required

# If calibration information is not supplied, instrument will be conditioned as a counter; input A + input B; for open collector inputs; rate & total scale factors of 1.
The BA369 is an intrinsically safe, battery powered, panel mounting digital clock that will accurately display local time in a hazardous area.

The clock incorporates a temperature compensated crystal oscillator that ensures less than one minute error per year at ambient temperatures between 0 and 40°C. For most industrial applications this accuracy is adequate, but if greater precision is required, or the display must be traceable, the BA369 may be synchronised with an external time standard.

The 25mm high wide-angle display is easy to read and allows installation of the clock in almost any panel or cubicle. Hours and minutes are continuously displayed separated by a flashing colon to show that the clock is functioning correctly. Operating a front panel push-button will change the display to seconds or to the date. When the button is released the original display will return.

ATEX intrinsic safety certification permits permanent installation in Zones 0, 1 or 2. When used as a stand-alone clock no wiring is required. The clock is powered by an internal BEKA BA491 intrinsically safe battery that may be replaced within the hazardous area.

Programming and adjustment are performed via the front panel push-buttons which, to prevent unauthorised adjustment, may be protected by a user selectable four digit security code. All settings and adjustable parameters are contained in a simple, easy to use menu. In addition to entering the local time and date, this menu allows a twelve or twenty four hour format and automatic daylight saving to be selected. If used, the type of synchronisation can also be defined.

Three different synchronisations are selectable from within the programme menu. Connecting synchronising terminals 1 and 2 together will stop the clock at the current displayed time. When the terminals are disconnected the clock will restart from the nearest minute, the nearest hour or from a preset time entered via the programme menu. The two synchronising terminals have intrinsic safety output parameters that allow up to ten clocks to be connected in parallel. All the clocks may be synchronised by a single hazardous area switch, or connected to a common Zener barrier or galvanic isolator and synchronised from the safe area.

Elapsed time may also be displayed by the BA369 clock when the synchronising preset time is set to 00:00. Disconnecting the two synchronising terminals will reset the display to 00:00 and start the clock running. When the terminals are reconnected the clock will stop and display the elapsed time.

The front panel of the BA369 has IP66 protection and a neoprene gasket seals the joint between the clock and the panel making it suitable for use in areas that will be hosed.
SPECIFICATION

Display
Type 4 digit liquid crystal
Height 25.4mm
Format 12:00 or 24:00 hour
Annunciator Indicates PM when 12 hour format is selected.

Push-buttons
Operating ▼ Display shows date
Operating ▲ Display shows seconds

Accuracy Without external synchronisation
0 to 40˚C ±1 minute / year
-20 to 50˚C ±4 minutes / year

Automatic daylight saving Selectable function which on internationally agreed days advances display one hour in March and retards it in October.

Synchronisation Function Connecting terminals 1 & 2 together stops the clock. When the terminals are disconnected the clock will restart from the nearest minute, the nearest hour, or from a pre-set time depending upon how the clock has been programmed.

Input Terminals 1 & 2 must be connected together via a resistance of less than 500Ω for at least 1 second.

Battery
Type BA491 Battery Unit
Cert. No. ITS Ex01E2021U
Life 3 years typical continuous operation at 20˚C.

Intrinsic safety
Europe ATEX
Standard EN50020:1994
Code Group II Category 1G
Cert. No. EEx ia IIC T5 Ex02E2018 Barrier system
Location Zone 0, 1 or 2
Synchronising terminals 1 & 2 The synchronising terminals of up to ten BA369 clocks may be connected in parallel within the hazardous area. The clock(s) may be synchronised by any mechanically operated switch complying with the requirements for simple apparatus. Alternatively, the clock(s) may be synchronised by any safe area switch connected via a certified Zener barrier or galvanic isolator whose output parameters do not exceed:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uo</td>
<td>10V dc</td>
</tr>
<tr>
<td>Io</td>
<td>200mA</td>
</tr>
<tr>
<td>Po</td>
<td>0.7W</td>
</tr>
</tbody>
</table>

Japan TIIS
Cert. No. TC17569
Code ia IIC T5 Tamb -40 to +50˚C

Environmental
Operating temp -20 to +50˚C (certified for use at -40˚C)
Storage temperature -40 to 85˚C
Humidity To 95% @ 40˚C
Enclosure Front IP66, rear IP20
EMC In accordance with EU Directive 89/336/EEC, full report available.

DIMENSIONS (mm)

Recommended panel cut-out
DIN 43700
138.0 x 11.0 x 68.0 x 0.7 x 0.0
To achieve an IP65 seal between the instrument and the panel 136.0 x 9.5 x 68.0 x 0.5 x 0.0
Four panel mounting clips must be used

TERMINAL CONNECTIONS

Immunity No error for 10V/m field strength between 27MHz and 1GHz.
Emissions Undetectable above background noise. Class B equipment
Mechanical
Terminals Removable with screw clamp for 0.5 to 1.5mm² cable.
Weight 0.4kg
Accessories Tag strip Thermally printed tag strip secured by screws.

HOW TO ORDER

Model number Please specify
BA369
Accessories Please specify if required
Legend BA491 battery

Note: At 20˚C stored batteries lose 1% of their charge per year. Replacements may therefore be stocked on-site.
A unique range of bus powered single variable fieldbus indicators and eight variable fieldbus displays, including FISCO compliant intrinsically safe, FNICO compliant Type nL and safe area models.

The single variable indicators employ FOUNDATION fieldbus™ protocol and the eight variable displays are available with a choice of FOUNDATION fieldbus™ or Profibus PA protocols.

All the intrinsically safe instruments are ATEX, FM, and IECEx certified and the fieldbus indicators also have CFM approval allowing installation in Canada.

For installations in Zone 2, the BA414NDF indicator has ATEX and IECEx Type nL certification and for Division 2 applications in North America, all the FM intrinsically safe models also have nonincendive approval.

To select the model for your application, please refer to the summary on the following page.
## Intrinsicly safe models

<table>
<thead>
<tr>
<th>Model</th>
<th>BA414DF</th>
<th>BA418CF</th>
<th>BA484DF</th>
<th>BA488CF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page no.</td>
<td>107</td>
<td>111</td>
<td>113</td>
<td>115</td>
</tr>
<tr>
<td>No of variables</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Protocol</td>
<td>FF</td>
<td>FF</td>
<td>FF or Profibus PA</td>
<td>FF or Profibus PA</td>
</tr>
<tr>
<td>Mounting &amp; enclosure</td>
<td>Field GRP</td>
<td>Panel 144 x 72</td>
<td>Field GRP</td>
<td>Panel 144 x 72</td>
</tr>
<tr>
<td>Protection</td>
<td>IP66</td>
<td>IP66 rear IP20</td>
<td>IP66</td>
<td>IP66 rear IP20</td>
</tr>
<tr>
<td>Certification Europe</td>
<td>FISCO compliant ATEX Group II, Category 1G or 1GD</td>
<td>FISCO compliant ATEX Group II, Category 2G</td>
<td>FISCO compliant ATEX Group II, Category 1G or 1GD</td>
<td>FISCO compliant ATEX Group II, Category 1G</td>
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<td>USA</td>
<td>FM Class 3610 Intrinsic Safety</td>
<td>FM Class 3610 Intrinsic Safety</td>
<td>FM Class 3610 Intrinsic Safety</td>
<td>FM Class 3610 Intrinsic Safety</td>
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<tr>
<td>Canada</td>
<td>C22.2 Intrinsic Safety and nonincendive</td>
<td>Class 3611 Nonincendive</td>
<td>Class 3611 Nonincendive</td>
<td>–</td>
</tr>
<tr>
<td>International</td>
<td>IECEx Ex ia IIC T4 or Ex ia IIC T4 DIP A21 TA 100˚C IP66</td>
<td>IECEx Ex ia IIC T4</td>
<td>IECEx Ex ia IIC T4 or Ex ia IIC T4 DIP A21 TA 125˚C IP66</td>
<td>IECEx Ex ia IIC T4</td>
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<tr>
<td>Options</td>
<td>Alarms</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

## Type nL model

<table>
<thead>
<tr>
<th>Model</th>
<th>BA414NDF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page no.</td>
<td>109</td>
</tr>
<tr>
<td>No of variables</td>
<td>1</td>
</tr>
<tr>
<td>Protocol</td>
<td>FF</td>
</tr>
<tr>
<td>Mounting &amp; enclosure</td>
<td>Field GRP</td>
</tr>
<tr>
<td>Protection</td>
<td>IP66</td>
</tr>
<tr>
<td>Certification Europe</td>
<td>FNICO compliant ATEX Group II, Category 3G or 3GD</td>
</tr>
<tr>
<td>International</td>
<td>IECEx Ex nL IIC T4 or Ex nL IIC T4 DIP A22 TA 100˚C IP66</td>
</tr>
</tbody>
</table>

## General purpose models

<table>
<thead>
<tr>
<th>Model</th>
<th>BA614DF</th>
<th>BA618CF</th>
<th>BA684DF</th>
<th>BA688CF</th>
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</thead>
<tbody>
<tr>
<td>Page no.</td>
<td>117</td>
<td>119</td>
<td>121</td>
<td>123</td>
</tr>
<tr>
<td>No of variables</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Protocol</td>
<td>FF</td>
<td>FF</td>
<td>FF or Profibus PA</td>
<td>FF or Profibus PA</td>
</tr>
<tr>
<td>Mounting &amp; enclosure</td>
<td>Field GRP</td>
<td>Panel 144 x 72</td>
<td>Field GRP</td>
<td>Panel 144 x 72</td>
</tr>
<tr>
<td>Protection</td>
<td>IP66</td>
<td>Front IP66 rear IP20</td>
<td>IP66</td>
<td>Front IP66 rear IP20</td>
</tr>
<tr>
<td>Options</td>
<td>Alarms</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
The BA414DF Fieldbus Indicator is a new cost-effective intrinsically safe field mounting instrument that displays a single fieldbus process variable in a hazardous area. housed in a robust IP66 GRP enclosure, the instrument has a large, high contrast five digit display, plus a horizontal bargraph. The BA414DF indicator uses the same technology and compliments the well established BEKA eight variable fieldbus displays that are now in worldwide use.

**Powered by the fieldbus** the BA414DF only requires a 2-wire connection to the intrinsically safe fieldbus segment, no additional power supply is required. Compatibility with most FOUNDATION fieldbus™ hosts is ensured by the use of a single Input Selector function block, which is supported by nearly all systems. Please contact the BEKA sales office for the latest compatibility information. The instrument has been registered by The Fieldbus Foundation™ and Device Description Files may be downloaded from their web site or from www.beka.co.uk.

The liquid crystal display has large characters and is designed to provide maximum contrast and a wide viewing angle which enables the BA414DF indicator to be easily read in most lighting conditions. Five digits, with four decimal points and a negative sign, may be configured to display any value between –99999 and 99999. The 31 segment horizontal bargraph, which provides a bold analogue indication of the fieldbus variable, may be conditioned to any starting and finishing values within the fieldbus variable’s range.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection, which has been independently assessed by Intertek Testing Services – report available. A separate terminal compartment allows the instrument to be installed and terminated without exposing the indicator electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and clamping screws are both forward facing. The indicator may also be mounted onto a vertical or horizontal pipe using one of the accessory kits.

**ATEX intrinsic safety certification** allows the BA414DF to be installed in all gas hazardous areas. The two fieldbus terminals comply with the Fieldbus Intrinsic Safety Concept (FISCO) simplifying system design and documentation. Separate entity input safety parameters also allow connection to most non-FISCO intrinsically safe systems. A BA414DF indicator may therefore be connected to almost any intrinsically safe fieldbus segment, provided the segment can supply 13mA to power the instrument. For applications in combustible dusts a separate version is available.

FM, CFM and IECEx approvals allow installation in the USA, Canada, plus the growing number of countries accepting IECEx certificates which already includes Australia and New Zealand. All approvals incorporate FISCO certification. Details of the versions available are shown in the How to Order section on the reverse side of this datasheet.

The FOUNDATION fieldbus™ Interface Guide contains commissioning information for the BA414DF indicator. A copy may be requested from the BEKA sales office or from the BEKA web site at www.beka.co.uk

Units of measurement and the instrument application or tag number can be economically marked onto the display escutcheon prior to despatch or after installation on-site. Alternatively, for customers who prefer a stainless steel label, the indicator can be supplied with a removable blank or custom etched stainless steel plate mounted on the front of the enclosure.

For panel mounting applications see the BA418CF datasheet. This instrument has a similar electrical specification but is housed in a 144 x 72 panel mounting enclosure.

### BA414DF

**Fieldbus indicator**

**Single variable**

**Intrinsically safe for use in gas and dust hazardous areas**

- 20mm high easy to read 5 digit display
- 31 segment bargraph
- FOUNDATION fieldbus™ protocol
- Compatible with most system hosts
- Intrinsically safe ATEX gas or ATEX gas & dust or FM, CFM & ATEX gas
- All models have IECEx certification
- Entity parameters & FISCO compliant
- IP66 field mounting GRP enclosure
- 3 year guarantee
**SPECIFICATION**

**Display**
- Type: Liquid crystal
- 5 digits plus sign, 20mm high (-99999 to 99999)
- 31 segment bargraph

**Fieldbus communication**
- Voltage: 9 to 32V
- Current: 13mA
- Compliant with IEC61158—2
- Clause 11 and 22
- Protocol: FOUNDATION fieldbus™
- Function block: 1 x IS (input selector)

**Intrinsic safety**
- **Europe ATEX**
  - Standard: EN50020:2002
  - Code: Group II Category 1G
  - EEx ia IIC T4
  - Tamb = -40 to 70°C
  - or
  - Group II Category 1GD
  - T100°C IP66
  - EEx ia IIC T4
  - Tamb = -20 to 60°C

**Input parameters**
- **Entity**
  - Ui = 22V
  - li = 250mA
  - Pi = 1.2W
- **FISCO**
  - Ui = 17.5V
  - li = 380mA
  - Pi = 5.32W

**Location**
- **Gas** Zone 0, 1 or 2
- **Dust** Zone 20, 21 or 22

**Cert. No.** ITS06ATEX25313

**USA FM**
- Standard
  - 3610 Entity: CL I, II, III: Div 1
  - GP A, B, C, D, E, F & G
  - T4 @ 70°C
- Standard
  - 3611 Nonincendive
  - CL I, II, III: Div 2
  - GP A, B, C, D, E, F & G
  - T4 @ 70°C

**Canada CFM**
- Standard
  - 3027031

**International IECEx**
- Standard
  - IEC60079-11:1999
  - Ex ia IIC T4
  - Ta = -40 to 70°C
  - or
  - Ex ia IIC T4 DIP A21
  - TA 100°C IP66
  - Ta = -20 to 60°C

**Cert. No.** IECEx ITS 06.0012

**Environmental**
- Operating temp: -20 to 70°C
- ATEX & IECEx certification gas
- -40°C to 70°C
dust
- -20°C to 60°C
- Storage temp: -40 to 85°C
- Humidity: To 95% @ 40°C
- Enclosure: IP66
- EMC: In accordance with EU Directive 89/336/EEC

**DIMENSIONS (mm)**

**TERMINAL CONNECTIONS**

**TERMINAL CONNECTIONS**

**USA FM**
- Standard
  - 3610 Entity: CL I, II, III: Div 1
  - GP A, B, C, D, E, F & G
  - T4 @ 70°C
- Standard
  - 3611 Nonincendive
  - CL I, II, III: Div 2
  - GP A, B, C, D, E, F & G
  - T4 @ 70°C

**Canada CFM**
- Standard
  - 3027031

**International IECEx**
- Standard
  - IEC60079-11:1999
  - Ex ia IIC T4
  - Ta = -40 to 70°C
  - or
  - Ex ia IIC T4 DIP A21
  - TA 100°C IP66
  - Ta = -20 to 60°C

**Cert. No.** IECEx ITS 06.0012

**Environmental**
- Operating temp: -20 to 70°C
- ATEX & IECEx certification gas
- -40°C to 70°C
dust
- -20°C to 60°C
- Storage temp: -40 to 85°C
- Humidity: To 95% @ 40°C
- Enclosure: IP66
- EMC: In accordance with EU Directive 89/336/EEC

**HOW TO ORDER**

**Model number**
- Please specify
  - BA414DF
  - ATEX gas
  - ATEX gas & dust
  - or
  - FM, CFM & IECEx gas
  - or
  - All versions have IECEx certification.
  - Note: Cable entries differ for FM & ATEX versions

**Accessories**
- Please specify if required
  - Escutcheon markings: Scale legend
  - Tag legend
  - Stainless legend plate: Legend
  - Pipe mounting kit: BA392D or BA393

**Immunity**
- BS EN 61326:1998
- Operates normally with conducted 3Vrms between 0.15kHz and 80MHz radiated 10V/m between 80MHz and 1GHz.

**Emissions**
- CISPR16-1/2 Class A

**Mechanical**
- Terminals: Screw clamp for 0.5 to 1.5mm² cable.
- Weight: 1.6kg

**Accessories**
- Scale legend: Units of measurement marked onto display escutcheon.
- Tag legend: Tag number or applicational information marked onto display escutcheon.
- Stainless legend plate: Stainless steel plate etched with tagging or applicational information secured to the front of the instrument.

**Pipe mounting kit**
- BA392D or BA393

**Fieldbus interface guide**
- May be downloaded from www.beka.co.uk
The BA414NDF Fieldbus Display is a new cost-effective Type nL field mounting instrument that can display a single fieldbus process variable in a Zone 2 or Zone 22 hazardous area. Housed in a robust IP66 GRP enclosure, the instrument has a large, high contrast five digit display, plus a horizontal bargraph. The BA414NDF uses the same technology and compliments the well established BEKA eight variable fieldbus displays that are now in worldwide use.

Powered by the fieldbus the BA414NDF only requires a 2-wire connection to the Type nL fieldbus segment, no additional power supply is required. Compatibility with most Foundation fieldbus™ hosts is ensured by the use of a single Input Selector function block which is supported by nearly all systems. Please contact the BEKA sales office for the latest compatibility information. The instrument has been registered by The Fieldbus Foundation™ and Device Description Files may be downloaded from their web site or from www.beka.co.uk.

The liquid crystal display has large characters and is designed to provide maximum contrast and a wide viewing angle which enables the BA414NDF indicator to be easily read in most lighting conditions. Five digits, with four decimal points and a negative sign may be configured to display any value between –99999 and 99999. The 31 segment horizontal bargraph, which provides a bold analogue indication of the fieldbus variable, may be conditioned to any starting and finishing values within the fieldbus variable’s range.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection, which has been independently assessed by Intertek Testing Services – report available. A separate terminal compartment allows the instrument to be installed and terminated without exposing the indicator electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and clamping screws are both forward facing. The indicator may also be mounted onto a vertical or horizontal pipe using one of the accessory kits.

ATEX Type nL certification allows the BA414NDF to be installed in Zone 2 gas hazardous areas. The two fieldbus terminals comply with the Fieldbus Non-incendive Concept (FNICO) simplifying system design and documentation. Separate entity input safety parameters also allow connection to most non-FNICO Type nL systems. A BA414NDF indicator may therefore be connected to almost any Type nL fieldbus segment, provided the segment can supply 13mA to power the instrument. For applications in combustible dusts a separate version is available, see How to Order on the reverse side of this datasheet.

IECEx approvals allow installation in the growing number of countries accepting IECEx certificates which already includes Australia and New Zealand. The approval includes FNICO certification.

The Foundation fieldbus™ Interface Guide contains commissioning information for the BA414NDF indicator. A copy may be requested from the BEKA sales office or from the BEKA web site at www.beka.co.uk.

Units of measurement and the instrument application or tag number can be economically marked onto the display escutcheon prior to despatch or after installation on-site. Alternatively, for customers who prefer a stainless steel label, the indicator can be supplied with a removable blank or custom engraved stainless steel plate mounted on the front of the enclosure.

For nonincendive applications in the USA & Canada please see datasheets for the BA414DF and BA418CF. These field and panel mounting fieldbus indicators have FM and CFM nonincendive approval.
**SPECIFICATION**

**Display**
- **Type**
  - Liquid crystal
  - 5 digits plus sign, 20mm high
  - (-99999 to 99999)
  - 31 segment bargraph
- **Variables**
  - Single

**Fieldbus communication**
- **Voltage** 9 to 32V
- **Current** 13mA
- **Compliant with** IEC61158-2
  - Clauses 11 and 22
- **Protocol** Foundation fieldbus™
- **Function block** 1 x IS (input selector)

**Type nL certification**

**Europe ATEX**
- **Standard** EN60079-15:2005
- **Code** Group II Category 3G
- **Ex nL T4**
  - Tamb = -20 to 70˚C
- **or** Group II Category 3GD, T100˚C IP66
  - Ex nL T4
  - Tamb = -20 to 60˚C

**Input parameters**
- **Entity**
  - Ui = 36V
  - II = 250mA
  - Pi = 1.2W
- **FNICO**
  - Ui = 17.5V
  - II = 380mA
  - Pi = 5.32W

**Location**
- **Gas** Zone 2
- **Dust** Zone 22

**Type Examination Certificate**
- **International IECEx**
  - **Standard** IEC60079-15:2001
  - **Code** Ex nL IIC T4
  - Ta = -20 to 70˚C
  - **or** Ex nL IIC T4 DIP A22
    - TA 100˚C IP66
    - Ta = -20 to 60˚C
- **Cert. No.** IECEx ITS 06.0015

**Environmental**
- **Operating temp**
  - In flammable gas -20 to 70˚C
  - In combustible dust -20 to 60˚C
- **Storage temp** -40 to 85˚C
- **Humidity** To 95% @ 40˚C
- **Enclosure** IP66
- **EMC** In accordance with EU Directive 89/336/EEC
- **Immunity** BS EN 61326:1998
- **Operates normally with conducted 3Vrms**
  - 13mA between 0.15kHz and 80MHz, radiated
  - 10V/m between 80MHz and 1GHz
- **Emissions** CISPR16-1/2 Class A

**Mechanical**
- **Terminals** Screw clamp for 0.5 to 1.5mm² cable.
- **Weight** 1.6kg

**DIMENSIONS (mm)**

**ACCESSORIES**
- **Scale legend**
- **Tag legend**
- **Stainless legend**
- **Pipe mounting kit** BA392D or BA393

**FIELDBUS INTERFACE**
- May be downloaded from www.beka.co.uk

**HOW TO ORDER**
- Please specify
  - Model number BA414NDF
  - Certification ATEX & IECEx gas
  - **or** ATEX & IECEx gas & dust
  - Accessories Please specify if required
    - Scale legend
    - Tag legend
    - Stainless legend plate
    - Pipe mounting kit BA392D or BA393
The BA418CF Fieldbus Indicator is a new cost-effective intrinsically safe panel mounting instrument that displays a single fieldbus process variable in a hazardous area. Housed in a robust panel mounting enclosure with an IP66 front, the instrument has a large, high contrast five digit display and a horizontal bargraph. The BA418CF indicator uses the same technology and compliments the well established BEKA eight variable fieldbus displays that are now in worldwide use.

Powered by the fieldbus the BA418CF only requires a 2-wire connection to the intrinsically safe fieldbus segment, no additional power supply is required. Compatibility with most FOUNDATION fieldbus™ hosts is ensured by the use of a single Input Selector function block, which is supported by nearly all systems. Please contact the BEKA sales office for the latest compatibility information. The instrument has been registered by The Fieldbus Foundation™ and Device Description Files may be downloaded from their web site or from www.beka.co.uk.

The liquid crystal display has large characters and is designed to provide maximum contrast and a wide viewing angle, thus enabling the BA418CF indicator to be easily read in most lighting conditions. Five digits, with four decimal points and a negative sign, may be configured to display any value between –99999 and 99999. The 31 segment horizontal bargraph, which provides a bold analogue indication of the fieldbus variable, may be conditioned to any starting and finishing values within the range of the fieldbus variable.

The instrument front panel provides IP66 protection and a neoprene gasket seals the joint between the fieldbus indicator and the panel, making it suitable for use in areas that will be cleaned with a hose. To simplify installation and maintenance, the indicator has a removable terminal block that allows panel wiring to be completed before the BA418CF indicator is installed.

ATEX intrinsic safety certification allows the BA418CF to be installed in all gas hazardous areas. The two fieldbus terminals comply with the Fieldbus Intrinsic Safety Concept (FISCO) simplifying system design and documentation. Separate entity input safety parameters also allow connection to most non-FISCO intrinsically safe systems. A BA418CF indicator may therefore be connected to almost any intrinsically safe fieldbus segment, provided the segment can supply 13mA to power the instrument.

FM, CFM and IECEx approvals allow installation in the USA, Canada, plus the growing number of countries accepting IECEx certificates which already includes Australia and New Zealand. All approvals incorporate FISCO certification.

The FOUNDATION fieldbus™ Interface Guide contains commissioning information for the BA418CF indicator. A copy may be requested from the BEKA sales office or from the BEKA web site at www.beka.co.uk

Units of measurement can be marked onto the display escutcheon prior to despatch and the tag number or application information thermally printed onto the rear panel adjacent to the terminals.

For field mounting applications see the BA414DF datasheet. This instrument has a similar electrical specification but is housed in an IP66 field mounting enclosure.
**SPECIFICATION**

**Display**
- **Type**: Liquid crystal
- **5 digit 20mm high (-99999 to 99999)**
- **31 segment bargraph**

**Fieldbus communication**
- **Voltage**: 9 to 32V
- **Current**: 13mA
- **Compliant with**: IEC61158—2 Clauses 11 and 22
- **Protocol**: FOUNDATION fieldbus™
- **Function block**: 1 x IS (input selector)

**Intrinsic safety**
- **Europe ATEX**
  - **Standard**: EN50020:2002
  - **Code**: Group II Category 2G
  - **EEEx ia IIC T4**
  - **Tamb**: -40 to 70˚C
  - **Input parameters**
    - **Entity**: Ui = 22V
    - **Ii**: 250mA
    - **Pi**: 1.2W
  - **FISCO**
    - **Ui**: 17.5V
    - **Ii**: 380mA
    - **Pi**: 5.32W
  - **Location**: Zone 0, 1 or 2
  - **Cert. No.**: ITS06ATEX25314

**USA FM**
- **Standard**: 3610 Entity
  - **Code**: CL I: Div 1
  - **GP A, B, C & D**
  - **T4 @ 70˚C**
- **Standard**: 3611 Nonincendive
  - **Code**: CL I: Div 2
  - **GP A, B, C & D**
  - **T4 @ 70˚C**
- **File**: 3027031
- **Canada CFM**
  - **File**: 3027031C

**International IECEx**
- **Standard**: IEC60079-11:1999
- **Code**: Ex ia IIC T4
- **Ta**: -40 to 70˚C
- **Cert. No**: IECEx ITS 06 0013X

**Environmental**
- **Operating temp**: -20 to +70˚C
  (ATEX, FM & IECEx certification -40˚C to 70˚C)
- **Storage temp**: -40 to 85˚C
- **Humidity**: To 95% @ 40˚C
- **Enclosure**: Front IP66, rear IP20
- **EMC**: In accordance with EU Directive 89/336/EEC
- **Immunity**: BS EN 61326:1998
  - Operates normally with conducted 3Vrms
  - between 0.15kHz and 80MHz, radiated
  - 10V/m between 80MHz and 1GHz.
- **Emissions**: CISPR16-1/2 Class A

**Mechanical**
- **Terminals**: Removable with screw clamp for 0.5 to 1.5mm² cable.
- **Weight**: 0.7kg

**DIMENSIONS (mm)**

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

**Accessories**
- **Scale legend**: Units of measurement marked onto display escutcheon.
- **Tag strip**: Thermally printed legend on rear of instrument
- **Fieldbus interface guide**: May be downloaded from www.beka.co.uk

**Model number**: Please specify
- **BA418CF**

**Accessories**
- **Please specify if required**
  - **Legend**
The BA484DF Fieldbus Display is an intrinsically safe instrument that can display up to eight fieldbus process variables. Nine selectable standard screen formats contain one, two, three or four variables, with units of measurement, tag descriptions and bargraphs on some screens. The use of standard screens simplifies commissioning, but if required dedicated screens tailored to an individual application can be constructed.

**FOUNDATION fieldbus™ and Profibus PA** versions of the BA484DF are available and have been registered by both organisations. The FOUNDATION fieldbus™ version now has selectable function blocks allowing use with most popular system hosts. Configuration files may be downloaded from the appropriate Fieldbus Foundation™ or Profibus sites, or from www.beka.co.uk.

**Powered by the fieldbus** the BA484DF only requires a 2-wire connection, no additional power supply Zener barriers or galvanic isolators are required. The high contrast 86 x 45mm liquid crystal display incorporates a green backlight enabling the display to be read in all lighting conditions from full sunlight to total darkness.

**Simple commissioning** results from the use of standard display formats. Apart from loading the BA484DF configuration files onto the system host and selecting the fieldbus variables to be displayed, no programming is required. Configuration of the BA484DF Fieldbus Display is performed via the fieldbus and the instrument front panel push buttons.

**ATEX, FM and IECEx intrinsic safety certification** allows the BA484DF to be installed in gas and dust hazardous areas. The two fieldbus terminals comply with the Fieldbus Intrinsic Safety Concept (FISCO) simplifying system design and documentation, although connection to non-FISCO intrinsically safe systems is possible using the entity concept. This allows a BA484DF display to be directly connected to almost any hazardous fieldbus segment, provided that the segment can supply the 25mA consumed by the display.

**Six optional alarm outputs** may be linked to any of the displayed variables. Each isolated single pole solid state output may be conditioned as a combined high and low alarm, or as just a high or low alarm. All the outputs comply with the requirements for simple apparatus, which permits them to switch any certified intrinsically safe load such as an intrinsically safe sounder, lamp or solenoid valve.

**Custom display screens** dedicated to a specific application can be created by writing to the transducer block parameters. Custom designed display screens can contain text in five different font sizes plus lines, boxes, bargraphs, simple graphics and fieldbus process variables. Free programming utilities to assist with screen development are available via the BEKA website.

**The four push buttons** on the front of the instrument may be used for returning operator acknowledgments or controls by reading a transducer block parameter. If larger industrial switches are required for these acknowledgements, up to six external push buttons may be connected to the BA484DF. When the external switches are activated, the front panel push buttons may be disabled or operated in parallel with the external switches.

**Comprehensive documentation** includes FOUNDATION fieldbus™ and Profibus Interface Guides and a Programming Guide that explains how to create custom display screens.

For panel mounting applications see the BA488CF datasheet. This instrument has a similar electrical specification but is housed in a 144 x 72 panel mounting enclosure.
## SPECIFICATION

### Display
- **Type**: 120 x 64 pixel liquid crystal
- **Size**: 86.5mm x 45mm
- **Backlight**: Powered from fieldbus
- **Screens**:
  - **Standard format**: 1, 2, 3 or 4 variables plus bargraph can include: units of measurement, tag information
  - **Custom format**: See Programming Guide
  - **Characters**: ASCII character set, 5 font sizes each with 4 computer definable soft characters.
- **Hidden screen**: May be written to at any time and displayed when required.

### Controls
- **Front panel**: Four push buttons which select the displayed screen. May be used for returning operator acknowledgements by reading transducer block parameters.
- **External switches**: Control may be transferred to six external switches; front panel buttons may be inhibited or operated in parallel.
- **Switch cable**: Length 5m max

### Fieldbus communication
- **Voltage**: 9 to 17.5V (limited by intrinsic safety parameters)
- **Current**: 25mA
- **Compliant with**: IEC61158–2
- **Clauses**: 11 and 22
- **Protocol**: FOUNDATION fieldbus™ or Profibus PA

### Intrinsic safety
- **Europe ATEX**:
  - **Code**: EN50020:2002
  - **Group II Category 1G, EEEx ia IIC (Tamb = -40 to 60°C)**
  - **Group II Category 1GD, T125°C IP66**
  - **Cert. No.**: ITS04ATEX22778
- **Intrinsic safety parameters**:
  - **Ui**: 17.5V
  - **Ii**: 380mA
  - **Pi**: 5.32W

### USA FM
- **Option, see How to order**
- **Code**: 3610 Entity
  - **CL, II, III; Div 1: GP A, B, C, D, F & G**
  - **T4 @ 60°C**
  - **File**: 3022546

### International IECEx
- **Standard**: IEC60079-11:1999
- **Code**:
  - **Ex ia IIC T4 (Tamb = -40 to 60°C)**
  - **Ex ia IIC T4 DIP A21 TA 125°C IP66 (Ta = -20 to 60°C)**
- **Cert. No.**: IECEx ITS 05.0006

### Environmental
- **Operating temp**: -20 to 60°C (ATEX gas certification -40 to 60°C)
- **Storage temp**: -40 to 85°C
- **Humidity**: To 95% @ 40°C
- **Enclosure**: IP66
- **EMC**: In accordance with EU Directive 89/336/EEC
  - BS EN 61326:1998
  - Operates normally with conducted 3Vrms interference between 0.15kHz and 80MHz, or radiated 10V/m interference between 80MHz and 1GHz. CISPR16-1/2 Class A

### Mechanical
- **Terminals**: Screw clamp for 0.5 to 1.5mm² cable.
- **Weight**: 1.6kg

### Accessories
- **Alarms**: Six galvanically isolated outputs which may be linked to displayed variables. Configurable as:
  - combined high and low alarm
  - high or low alarm
  - six alarms

## DIMENSIONS (mm)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>141</td>
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<tr>
<td>Height</td>
<td>212</td>
</tr>
<tr>
<td>Depth</td>
<td>72</td>
</tr>
</tbody>
</table>

### TERMINAL CONNECTIONS

- **External switches**: Dust option, see How to order
- **Fieldbus**: Dust option, see How to order
- **Optional alarm outputs**: Dust option, see How to order

### HOW TO ORDER

- **Model number**: BA484DF
- **Type of fieldbus**:
  - FOUNDATION fieldbus™ or Profibus PA
  - ATEX gas or dust
  - FM & ATEX gas
- **Certification**:
  - ATEX gas
  - ATEX gas & dust
  - FM & ATEX gas
- **Accessories**:
  - Six alarms
  - Tag strip
  - Tag plate
  - Pipe mounting kit

- **Please specify**:
  - Model number
  - Fieldbus type
  - Certification
  - Accessories

### Environmental
- **Operating temp**: -20 to 60°C (ATEX gas certification -40 to 60°C)
- **Storage temp**: -40 to 85°C
- **Humidity**: To 95% @ 40°C
- **Enclosure**: IP66
- **EMC**: In accordance with EU Directive 89/336/EEC
  - BS EN 61326:1998
  - Operates normally with conducted 3Vrms interference between 0.15kHz and 80MHz, or radiated 10V/m interference between 80MHz and 1GHz. CISPR16-1/2 Class A

### Mechanical
- **Terminals**: Screw clamp for 0.5 to 1.5mm² cable.
- **Weight**: 1.6kg

### Accessories
- **Alarms**: Six galvanically isolated outputs which may be linked to displayed variables. Configurable as:
  - combined high and low alarm
  - high or low alarm
  - six alarms
The BA488CF Fieldbus Display is an intrinsically safe instrument that can display up to eight fieldbus process variables. Nine selectable standard screen formats contain one, two, three or four variables, with units of measurement, tag descriptions and bargraphs on some screens. The use of standard screens simplifies commissioning, but if required dedicated screens tailored to an individual application can be constructed.

**FOUNDATION fieldbus™ and Profibus PA** versions of the BA488CF are available and have been registered by both organisations. The **FOUNDATION fieldbus™** version now has selectable function blocks allowing use with most popular system hosts. Configuration files may be downloaded from the appropriate Fieldbus Foundation™ or Profibus sites, or from www.beka.co.uk.

**Powered by the fieldbus** the BA488CF only requires a 2-wire connection, no additional power supply Zener barriers or galvanic isolators are required. The high contrast 86 x 45mm liquid crystal display incorporates a green backlight that is also powered from the fieldbus enabling the display to be read in all lighting conditions from full sunlight to total darkness.

**Simple commissioning** results from the use of standard display formats. Apart from loading the BA488CF configuration files onto the system host and selecting the fieldbus variables to be displayed, no programming is required. Configuration of the BA488CF Fieldbus Display is performed via the fieldbus and the instrument front panel push buttons.

**ATEX, FM & IECEx** intrinsic safety certification allows the BA488CF to be installed in gas hazardous areas worldwide. The two fieldbus terminals comply with the Fieldbus Intrinsic Safety Concept (FISCO) simplifying system design and documentation, although connection to non-FISCO intrinsically safe segments is possible using the entity concept. This allows a BA488CF to be directly connected to almost any hazardous fieldbus providing the segment can supply the 25mA consumed by the display.

**Six optional alarm outputs** may be linked to any of the displayed variables. Each isolated single pole solid state output may be conditioned as a combined high and low alarm, or as just a high or low alarm. All the outputs comply with the requirements for simple *apparatus*, which permits them to switch any certified intrinsically safe load such as an intrinsically safe sounder, lamp or solenoid valve.

**Custom display screens** dedicated to a specific application may be created by writing to the transducer block parameters. Custom designed displays can contain text in five different font sizes plus lines, boxes, bargraphs, simple graphics and fieldbus process variables. Free programming utilities to assist with screen development are available via the BEKA website.

The six push buttons on the front of the instrument may be used for returning operator acknowledgments or controls by reading a transducer block parameter. If larger industrial switches are required for these acknowledgements, up to six external push buttons may be connected to the BA488CF. When the external switches are activated, the front panel push buttons may be disabled or operated in parallel with the external switches.

**Comprehensive documentation** includes Foundation fieldbus™ and Profibus Interface Guides and a Programming Guide that explains how to create custom display screens.

**For field mounting applications** see the BA484DF datasheet. This instrument has a similar electrical specification but is housed in a robust IP66 GRP enclosure suitable for external mounting.
**SPECIFICATION**

**Display**
- Type: 120 x 64 pixel liquid crystal
- Size: 86.5mm x 45mm
- Backlight: Powered from fieldbus
- Screens:
  - Standard format: 1, 2, 3 or 4 variables plus bargraph can include: units of measurement, tag information
  - Custom format: ASCII character set, 5 font sizes each with 4 computer definable soft characters.
- Hidden screen: May be written to at any time and displayed when required.

**Controls**
- Front panel: Six push buttons which select the displayed screen. May be used for returning operator acknowledgements by reading transducer block parameters.
- External switches: Control may be transferred to six external switches; front panel buttons may be inhibited or operated in parallel.
- Switch cable: 5m max length.

**Fieldbus communication**
- Voltage: 9 to 17.5V (limited by intrinsic safety parameters)
- Current: 25mA
- Compliant with: IEC61158—2 Clauses 11 and 22
- Protocol: FOUNDATION fieldbus™ or Profibus PA
- Function blocks:
  - FOUNDATION fieldbus™: 1 x MAO (Multiple Analogue Output) or 2 x IS (Input Selector)
  - Profibus PA: 8 x AO (Analogue Output)

**Intrinsic safety**
- Europe ATEX:
  - Standard: EN60020:2002
  - Code: Group II Category 1G
  - Cert. No.: ITS04ATEX22779
  - Intrinsics parameters:
    - $U_i = 17.5V$
    - $I_i = 380mA$
    - $P_i = 5.32W$
  - FISCO compliant
  - Location: Zone 0, 1 or 2
- USA FM:
  - Standard: 3610 Entity
  - Code: CL I; Div 1; GP A, B, C & D
  - T4 @ 60°C
  - File No: 3022546
  - Standard: 3611 Nonincendive
    - Code: CL I; Div 2; GP A, B, C & D
    - T4 @ 60°C
    - File No: 3022546
- International IECEx:
  - Standard: IEC60079-11:1999
  - Code: Ex ia IIC T4
  - Ta = -40 to 60°C
  - Cert. No.: IECEx ITS 05.0007

**Environmental**
- Operating temp: -20 to +60°C (certified for use at -40°C)
- Storage temp: -40 to 85°C
- Humidity: To 95% @ 40°C
- Enclosure:
  - Front IP66
  - Rear IP20
- EMC:
  - In accordance with EU Directive 89/336/EEC
- Immunity:
  - BS EN 61326:1998
  - Operates normally with conducted 3Vrms interference between 0.15kHz and 80MHz, or radiated 10V/m interference between 80MHz and 1GHz.
- Emissions:
  - CISPR 16-1/2 Class A

**Mechanical**
- Terminals: Removable with screw clamp for 0.5 to 1.5mm² cable.
- Weight: 0.7kg

**Accessories**
- Alarms: Six galvanically isolated outputs which may be linked to displayed variables. Configurable as: combined high and low alarm, high or low alarm

**DIMENSIONS (mm)**

Recommended panel cut-out:
- DIN 43 700
- 138.0 x 1.0 / -0.0 x 68.0 +0.7 / -0.0
- To achieve an IP65 seal between the instrument and the panel, the panel mounting clips must be used.

**TERMINAL CONNECTIONS**

- Contacts: Isolated single pole solid state switch certified as simple apparatus.
  - Ron: less than 5Ω + 0.7V
  - Roff: greater than 1MΩ
  - $U_i = 28Vdc$
  - $I_i = 200mA$
  - $P_i = 0.84W$
- Tag number: Thermally printed strip on rear of instrument.
- Programming guide: May be downloaded from www.beka.co.uk
- Fieldbus interface guides: May be downloaded from www.beka.co.uk

**HOW TO ORDER**

- Model number: BA488CF
- Type of fieldbus:
  - FOUNDATION fieldbus™
  - or Profibus PA
- Accessories:
  - Please specify if required
    - Alarms
    - Tag strip

**TERMINAL CONNECTIONS**

- Contacts: Isolated single pole solid state switch certified as simple apparatus.
  - Ron: less than 5Ω + 0.7V
  - Roff: greater than 1MΩ
  - $U_i = 28Vdc$
  - $I_i = 200mA$
  - $P_i = 0.84W$
- Tag number: Thermally printed strip on rear of instrument.
- Programming guide: May be downloaded from www.beka.co.uk
- Fieldbus interface guides: May be downloaded from www.beka.co.uk

**HOW TO ORDER**

- Model number: BA488CF
- Type of fieldbus:
  - FOUNDATION fieldbus™
  - or Profibus PA
- Accessories:
  - Please specify if required
    - Alarms
    - Tag strip
The BA614DF Fieldbus Indicator is a new cost-effective field mounting instrument that displays a single fieldbus variable in a process area. Housed in a robust IP66 GRP enclosure, the instrument has a large, high contrast five digit display, plus a horizontal bargraph. The BA614DF indicator uses the same technology and compliments the well established BEKA eight variable fieldbus displays that are now in worldwide use.

**Powered by the fieldbus** the BA614DF only requires a 2-wire connection to the fieldbus segment, no additional power supply is required. Compatibility with most FOUNDATION fieldbus™ hosts is ensured by the use of a single Input Selector function block, which is supported by nearly all systems. Please contact the BEKA sales office for the latest compatibility information. The instrument has been registered by The Fieldbus Foundation™ and Device Description Files may be downloaded from their web site or from www.beka.co.uk.

The liquid crystal display has large characters and is designed to provide maximum contrast and a wide viewing angle which enables the BA614DF indicator to be easily read in most lighting conditions. Five digits, with four decimal points and a negative sign, may be configured to display any value between –99999 and 99999. The 31 segment horizontal bargraph, which provides a bold analogue indication of the fieldbus variable, may be conditioned to any starting and finishing values within the fieldbus variable’s range.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection, which has been independently assessed by Intertek Testing Services – report available. A separate terminal compartment allows the instrument to be installed and terminated without exposing the indicator electronics. To further simplify field wiring and subsequent inspection, the terminal cable entries and clamping screws are both forward facing. The indicator may also be mounted onto a vertical or horizontal pipe using one of the accessory kits.

The FOUNDATION fieldbus™ Interface Guide contains commissioning information for the BA614DF indicator. A copy may be requested from the BEKA sales office or from the BEKA web site at www.beka.co.uk

Units of measurement and the instrument application or tag number can be economically marked onto the display escutcheon prior to despatch or after installation on-site. Alternatively, for customers who prefer a stainless steel label, the indicator can be supplied with a removable blank or custom etched stainless steel plate mounted on the front of the enclosure.

For panel mounting applications, see the BA618CF datasheet. This instrument is electrically identical to the BA614DF but is housed in a 144 x 72 panel mounting enclosure with an IP66 front.

For use in hazardous areas the intrinsically safe BA414DF and Type nL BA414NDF single variable fieldbus indicators are available. These have similar specifications as the BA614DF plus international certification allowing installation in most gas and dust hazardous areas.
### SPECIFICATION

**Display**
- **Type**: Liquid crystal
- **Variables**: Single

**Fieldbus communication**
- **Voltage**: 9 to 32V
- **Current**: 13mA
- **Compliant with**: IEC61158—2
- **Protocol**: Foundation fieldbus™
- **Function block**: 1 x IS (input selector)

**Environmental**
- **Operating temp**: -20 to 70˚C
- **Storage temp**: -40 to 85˚C
- **Humidity**: To 95% @ 40˚C
- **Enclosure**: IP66
- **EMC**: In accordance with EU Directive 89/336/EEC
- **Immunity**: BS EN 61326:1998
- **Emissions**: CISPR16-1/2 Class A

**Mechanical**
- **Terminals**: Screw clamp for 0.5 to 1.5mm² cable.
- **Weight**: 1.6kg

**Accessories**
- **Scale legend**: Units of measurement marked onto display escutcheon.
- **Tag legend**: Tag number or applicational information marked onto display escutcheon.
- **Stainless legend plate**: Stainless steel plate etched with tagging or applicational information secured to the front of the instrument.
- **Pipe mounting kit**: BA392D or BA393
- **Fieldbus interface guide**: May be downloaded from www.beka.co.uk

### DIMENSIONS (mm)

- **Case**: 212 x 141 x 91
- **Two M6 clearance holes for surface mounting**
- **Three M20 x 1.5 tapped cable entries**

### TERMINAL CONNECTIONS

- **Case**
- **1**
- **2**
- **Fieldbus**

### HOW TO ORDER

**Model number**: BA614DF

**Accessories**
- **Please specify if required**
- **Escutcheon markings**
  - **Scale legend**
  - **Tag legend**
  - **Stainless legend plate**
  - **Legend**
- **Pipe mounting kit**: BA392D or BA393
The BA618CF Fieldbus Indicator is a new cost-effective panel mounting instrument that displays a single fieldbus variable in a control room or process area. Housed in a robust panel mounting enclosure with an IP66 front, the instrument has a large, high contrast five digit display and a horizontal bargraph. The BA618CF indicator uses the same technology and compliments the well established BEKA eight variable fieldbus displays that are now in worldwide use.

**Powered by the fieldbus**

The BA618CF only requires a 2-wire connection to the fieldbus segment, no additional power supply is required. Compatibility with most FOUNDATION fieldbus™ hosts is ensured by the use of a single Input Selector function block, which is supported by nearly all systems. Please contact the BEKA sales office for the latest compatibility information. The instrument has been registered by The Fieldbus Foundation™ and Device Description Files may be downloaded from their web site or from www.beka.co.uk.

**The liquid crystal display** has large characters and is designed to provide maximum contrast and a wide viewing angle, thus enabling the BA618CF indicator to be easily read in most lighting conditions. Five digits, with four decimal points and a negative sign, may be configured to display any value between –99999 and 99999. The 31 segment horizontal bargraph, which provides a bold analogue indication of the fieldbus variable, may be conditioned to any starting and finishing values within the range of the fieldbus variable.

**The instrument front panel** provides IP66 protection and a neoprene gasket seals the joint between the fieldbus indicator and the panel, making it suitable for use in areas that will be cleaned with a hose. To simplify installation and maintenance, the indicator has a removable terminal block that allows panel wiring to be completed before the BA618CF indicator is installed.

**The FOUNDATION Fieldbus Interface Guide** contains commissioning information for the BA618CF indicator. A copy may be requested from the BEKA sales office or from the BEKA web site at www.beka.co.uk.

Units of measurement can be marked onto the display escutcheon prior to despatch and the tag number or application information thermally printed onto the rear panel adjacent to the terminals.

**For field mounting applications** see the BA614DF datasheet. This instrument is electrically identical to the BA618CF but is housed in a robust IP66 field mounting enclosure.

**For use in hazardous areas** the intrinsically safe BA418CF single variable panel mounting fieldbus indicator is available. This has a similar specification as the BA618CF plus international certification allowing installation in most gas hazardous areas.
### SPECIFICATION

**Display**
- **Type**: Liquid crystal
  - 5 digit 20mm high (-99999 to 99999)
  - 31 segment bargraph
- **Variables**: Single

**Fieldbus communication**
- **Voltage**: 9 to 32V
- **Current**: 13mA
- **Compliant with**: IEC61158—2
  - Clauses 11 and 22
- **Protocol**: Foundation fieldbus™
- **Function block**: 1 x IS (input selector)

**Environmental**
- **Operating temp**: -20 to +70°C
- **Storage temp**: -40 to 85°C
- **Humidity**: To 95% @ 40°C
- **Enclosure**: Front IP66, rear IP20
- **EMC**: In accordance with EU Directive 89/336/EEC
  - Operates normally with conducted 3Vrms between 0.15kHz and 80MHz. radiated
  - 10V/m between 80MHz and 1GHz.
- **Emissions**: CISPR16-1/2 Class A

**Mechanical**
- **Terminals**: Removable with screw clamp for 0.5 to 1.5mm² cable.
- **Weight**: 0.7kg

**Accessories**
- **Scale legend**: Units of measurement marked onto display escutcheon.
- **Tag strip**: Thermally printed legend on rear of instrument.
- **Fieldbus interface guide**: May be downloaded from www.beka.co.uk

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### DIMENSIONS (mm)

**Recommended panel cut-out**
- DIN 43 700
  - 138.0 +1.0/-0.0 x 68.0 +0.7/-0.0

To achieve an IP66 seal between the instrument and the panel
- 136.0 +0.5/-0.0 x 66.2 +0.5/-0.0

Four panel mounting clips must be used

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

Please specify
- **Model number**: BA618CF

Please specify if required
- **Accessories**
  - Scale marking on escutcheon
  - Tag strip
- **Legend**
The BA684DF Fieldbus Display is a general purpose instrument that can display up to eight fieldbus process variables. Nine selectable standard screen formats contain one, two, three or four variables, with units of measurement, tag descriptions and bargraphs on some screens. The use of standard screens simplifies commissioning, but if required dedicated screens tailored to an individual application can be constructed.

FOUNDATION fieldbus™ and Profibus PA versions of the BA684DF are available and have been registered by both organisations. Foundation fieldbus™ version now has selectable function blocks allowing use with most popular system hosts. Configuration files may be downloaded from the appropriate Fieldbus Foundation™ or Profibus sites, or from www.beka.co.uk.

Powered by the fieldbus the BA684DF only requires a 2-wire connection, no additional power supply is required. The high contrast 86 x 45mm liquid crystal display incorporates a green backlight enabling the display to be read in all lighting conditions from full sunlight to total darkness.

Simple commissioning results from the use of standard display formats. Apart from loading the BA684DF configuration files onto the system host and selecting the fieldbus variables to be displayed, no programming is required. Configuration of the BA684DF Fieldbus Display is performed via the fieldbus and the instrument front panel push buttons; simple menus enable the required standard display format to be selected and the units of measurement and tag information for each variable to be entered.

Six optional alarm outputs may be linked to any of the displayed variables. Each isolated single pole solid state output, which will switch a low voltage dc load, may be conditioned as a combined high and low alarm, or as just a high or low alarm.

The four push buttons on the front of the instrument may be used for returning operator acknowledgments or controls by reading a transducer block parameter. If larger industrial switches are required for these acknowledgements, up to six external push buttons may be connected to the BA684DF. When the external switches are activated, the front panel push buttons may be disabled or operated in parallel with the external switches.

Comprehensive documentation includes Foundation fieldbus™ and Profibus Interface Guides and a Programming Guide that explains how to create custom display screens.

For panel mounting applications see the BA688CF datasheet. This instrument has a similar electrical specification but is housed in a 144 x 72 panel mounting enclosure.

If flammable atmospheres are present the intrinsically safe BA484DF fieldbus display should be used.

BA684DF applications vary from a simple single variable display using a standard format, to providing an operator interface with a custom display and control inputs via external buttons.

Custom display screens dedicated to a specific application can be created by writing to the transducer block parameters. Custom displays can contain text in five different font sizes plus lines, boxes, bargraphs, simple graphics and fieldbus process variables. Free programming utilities to assist with screen development are available via the BEKA web site.
## SPECIFICATION

### Display
- **Type**: 120 x 64 pixel liquid crystal
- **Size**: 86.5mm x 45mm
- **Backlight**: Powered from fieldbus
- **Screens**
  - **Standard format**: 1, 2, 3 or 4 variables plus bargraph can include:
    - units of measurement
    - tag information
  - **Custom format**: See Programming Guide
- **Characters**: ASCII character set, 5 font sizes each with 4 computer definable soft characters.
- **Hidden screen**: May be written to at any time and displayed when required.

### Controls
- **Front panel**: Four push buttons which select the displayed screen. May be used for returning operator acknowledgements by reading transducer block parameters.
- **External switches**: Control may be transferred to six external switches; front panel buttons may be inhibited or operated in parallel.
- **Switch cable**: Length 5m max

### Fieldbus communication
- **Voltage**: 9 to 32V
- **Current**: 25mA
- **Compliant with**: IEC61158—2 Clauses 11 and 22
- **Protocol**: FOUNDATION fieldbus™ or Profibus PA
- **Function blocks**
  - **FOUNDATION fieldbus™**: 1 x MAO (Multiple Analogue Output) or 2 x IS (Input Selector)
  - **Profibus PA**: 8 x AO (Analogue Output)

### Environmental
- **Operating temp**: -20 to +60˚C
- **Storage temp**: -40 to +85˚C
- **Humidity**: 95% @ 40˚C
- **Enclosure**: IP66
- **EMC**: In accordance with EU Directive 89/336/EEC
- **Immunity**: BS EN 61326:1998 Operates normally with conducted 3Vrms interference between 0.15kHz and 80MHz, or radiated 10V/m interference between 80MHz and 1GHz.
- **Emissions**: CISPR16-1/2 Class A

### Mechanical
- **Terminals**: Screw clamp for 0.5 to 1.5mm² cable.
- **Weight**: 1.6kg

### Accessories
- **Alarms**: Six galvanically isolated outputs which may be linked to displayed variables. Configurable as:
  - combined high and low alarm
  - high or low alarm
- **Contacts**: Isolated single pole solid state
  - Ron: less than 5Ω + 0.7V
  - Roff: greater than 1MΩ
  - Vmax: = 30V dc
  - Imax: = 200mA
- **Tag strip**: Printed legend behind the display window
- **Tag plate**: Engraved stainless steel plate attached to the side of the instrument.
- **Pipe mounting kit**: BA392D or BA393
- **Programming guide**: May be downloaded from www.beka.co.uk
- **Fieldbus interface guides**: May be downloaded from www.beka.co.uk

## DIMENSIONS (mm)

![Dimensions Diagram]

## TERMINAL CONNECTIONS

![Terminal Connections Diagram]

## HOW TO ORDER

**Model number**: BA684DF

**Type of fieldbus**: FOUNDATION fieldbus™ or Profibus PA

**Accessories**: Please specify if required
- Alarms
- Tag strip legend
- Tag plate legend
- Pipe mounting kit

**Pipe mounting kit**: BA392D or BA393

**Programming guide**: May be downloaded from www.beka.co.uk

**Fieldbus interface guides**: May be downloaded from www.beka.co.uk
The BA688CF Fieldbus Display is a general purpose instrument that can display up to eight fieldbus process variables. Nine selectable standard screen formats contain one, two, three or four variables, with units of measurement, tag descriptions and bargraphs on some screens. The use of standard screens simplifies commissioning, but if required dedicated screens tailored to an individual application can be constructed.

**FOUNDATION fieldbus™ and Profibus PA versions** of the BA688CF are available and have been registered by both organisations. The Foundation fieldbus™ version now has selectable function blocks allowing use with most popular system hosts. Configuration files may be downloaded from the appropriate Fieldbus Foundation™ or Profibus sites, or from [www.beka.co.uk](http://www.beka.co.uk).

**Powered by the fieldbus** the BA688CF only requires a 2-wire connection, no additional power supply is required. The high contrast 86 x 45mm liquid crystal display incorporates a green backlight that is also powered from the fieldbus enabling the display to be read in all lighting conditions from full sunlight to total darkness.

**Simple commissioning** results from the use of standard display formats. Apart from loading the BA688CF configuration files onto the system host and selecting the fieldbus variables to be displayed, no programming is required. Configuration of the BA688CF Fieldbus Display is performed via the fieldbus and the instrument front panel push buttons; simple menus enable the required standard display format to be selected and the units of measurement and tag information for each variable to be entered.

**Six optional alarm outputs** may be linked to any of the displayed variables. Each isolated single pole solid state output, which will switch a low voltage dc load, may be conditioned as a combined high and low alarm, or as just a high or low alarm.

**BA688CF applications** vary from a simple single variable display using a standard format, to providing an operator interface with a custom display and control inputs via external buttons.

**Custom display screens** dedicated to a specific application may be created by writing to the transducer block parameters. Custom displays can contain text in five different font sizes plus lines, boxes, bargraphs, simple graphics and fieldbus process variables. **Free programming utilities** to assist with screen development are available via the BEKA web site.

The six push buttons on the front of the instrument may be used for returning operator acknowledgments or controls by reading a transducer block parameter. If larger industrial switches are required for these acknowledgements, up to six external push buttons may be connected to the BA688CF. When the external switches are activated, the front panel push buttons may be disabled or operated in parallel with the external switches.

**Comprehensive documentation** includes Foundation fieldbus™ and Profibus Interface Guides and a Programming Guide that explains how to create custom display screens.

**For field mounting applications** see the BA688DF datasheet. This instrument has a similar electrical specification but is housed in a robust IP66 GRP enclosure suitable for external mounting.

If flammable atmospheres are present, the intrinsically safe BA488CF fieldbus display should be used.
**SPECIFICATION**

**Display**
- Type: 120 x 64 pixel liquid crystal
- Size: 86.5mm x 45mm
- Backlight: Powered from fieldbus

**Screens**
- Standard format: 1, 2, 3 or 4 variables plus bargraph can include:
  - units of measurement
  - tag information
- Custom format: See Programming Guide
- Characters: ASCII character set, 5 font sizes each with 4 computer definable soft characters.
- Hidden screen: May be written to at any time and displayed when required.

**Controls**
- Front panel: Six push buttons which select the displayed screen. May be used for returning operator acknowledgements by reading transducer block parameters.
- External switches: Control may be transferred to six external switches; front panel buttons may be inhibited or operated in parallel.
- Switch cable: 5m max length.

**Fieldbus communication**
- Voltage: 9 to 32V
- Current: 25mA
- Compliant with: IEC61158—2, Clauses 11 and 22
- Protocol: FOUNDATION fieldbus™ or Profibus PA
- Function blocks:
  - FOUNDATION fieldbus™: 1 x MAO (Multiple Analogue Output)
  - or: 2 x IS (Input Selector)
  - Profibus PA: 8 x AO (Analogue Output)

**Environmental**
- Operating temp: -20 to +60˚C
- Storage temp: -40 to +85˚C
- Humidity: To 95% @ 40˚C
- Enclosure: Front IP65, rear IP20
- EMC: In accordance with EU Directive 89/336/EEC
- Immunity: BS EN 61326:1998
- Operates normally with conducted 3Vrms interference between 0.15kHz and 80MHz, or radiated 10V/m interference between 80MHz and 1GHz.
- Emissions: CISPR 16-1/2 Class A

**Mechanical**
- Terminals: Removable with screw clamp for 0.5 to 1.5mm² cable.
- Weight: 0.7kg

**Accessories**
- Alarms: Six galvanically isolated outputs which may be linked to displayed variables.
- Configurable as:
  - combined high and low alarm
  - high or low alarm
- Contacts: Isolated single pole solid state switch.
  - Ron: less than 5Ω + 0.7V
  - Roff: greater than 1MΩ
  - Vmax: 30V dc
  - Imax: 200mA
- Tag number: Thermally printed strip on rear of instrument.
- Programming guide: May be downloaded from www.beka.co.uk
- Fieldbus interface guides: May be downloaded from www.beka.co.uk

**DIMENSIONS (mm)**

Recommended panel cut-out
- DIN 43 700: 138.0 +0.5/-0.0 x 66.2 +0.5/-0.0
- To achieve an IP65 seal between the instrument and the panel
- Four panel mounting clips must be used

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

- Model number: BA688CF
- Type of fieldbus: FOUNDATION fieldbus™ or Profibus PA
- Please specify if required:
  - Accessories: Six alarms
  - Tag strip
  - Legend

- Please specify:
  - Alarms
The intrinsically safe models, which now have FM as well as ATEX certification, were recently joined by two new general purpose displays with RS232 and RS485 communication ports.

All models support Modbus and BEKA protocol and include nine standard screen formats which display up to four variables on each screen, some with bargraphs. If custom display formats are required, these can be constructed using the free BEKA ScreenWriter software.

The text displays also feature a powerful Pattern Matching facility which enables the capture and display of data contained in proprietary ASCII serial strings.

To simplify hazardous area installations, the new dedicated BA201 galvanic isolator has RS232 and RS485 safe area ports and can power up to four BA484D and BA488C serial text displays.

To select the model for your application, please refer to the summary on the following page.

Intrinsically safe

- High contrast display with backlight
- Modbus, BEKA and legacy protocols
- Operator push-buttons and two outputs
- Panel and field mounting models
- Intrinsically safe models communicate via BA201 galvanic isolator

Serial text displays

Intrinsiquement sûrs

Généraux

- Affichage à contraste élevé
- Modbus et protocole BEKA
- Boutons poussoirs et deux sorties
- Modèles de panneau et de montage de champ
- Modèles intrinsèquement sûrs communiquent via isolateur galvanique BA201

Afficheurs de texte
liaison série

Gamme d’afficheurs en version sécurité intrinsèque et usage général en boîtier robuste et capables d’afficher des textes et graphiques simples. Tous les modèles supportent les protocoles Modbus et BEKA et comportent 9 formats d’écans standards permettant de visualiser jusqu’à 4 variables sur chaque écran ainsi que des bargraphs. Des écrans spécifiques peuvent être configurés. Pour les applications en zones à risques, l’isolateur BA 201 est capable d’alimenter jusqu’à 4 afficheurs.

Seriele Textanzeigen


Displays de textos

Instrumentos robustos, intrínsecamente seguros o para propósito general, para textos o gráficos sencillos. Todos los modelos soportan Modbus y protocolo BEKA e incluyen 9 formatos estándar de pantalla con hasta 4 variables, algunas de ellas con gráficos de barras. También se pueden utilizar formatos propios del cliente. Para las aplicaciones intrínsicamente seguras el nuevo aislador galvánico BA201 puede alimentar hasta 4 displays de textos.

<table>
<thead>
<tr>
<th>Afficheurs de texte liaison série</th>
<th>Seriele Textanzeigen</th>
<th>Displays de textos</th>
</tr>
</thead>
</table>
### Intrinsically safe models

<table>
<thead>
<tr>
<th>Model</th>
<th>BA484D</th>
<th>BA488C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page no.</td>
<td>127</td>
<td>129</td>
</tr>
<tr>
<td>Mounting</td>
<td>Field</td>
<td>Panel</td>
</tr>
</tbody>
</table>
| Protection  | IP66   | Front IP65  
|             |        | Rear  IP20 |
| Communication and power | Via BA201 galvanic isolator mounted in safe area which has RS232 and RS485 communications ports. See page 135  
|             | Other isolators may be used |
| Certification | Europe | ATEX Group II, Category 1G or ATEX Group II, Category 1GD  
|             | USA    | FM Class 3610 Entity  
|             |        | FM Class 3611 Nonincendive |
| Operator push-buttons | 4      | 6      |
| Optional remote operator push-buttons | 6      | 6      |
| Solid state outputs | 2      | 2      |
| Options     | Etched tag plate | Tag Strip |

### General purpose models

<table>
<thead>
<tr>
<th>Model</th>
<th>BA684D</th>
<th>BA688C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page no.</td>
<td>131</td>
<td>133</td>
</tr>
<tr>
<td>Mounting</td>
<td>Field</td>
<td>Panel</td>
</tr>
</tbody>
</table>
| Protection  | IP66   | Front IP65  
|             |        | Rear  IP20 |
| Power supply | 20 to 36V dc |
| Communication ports | RS232 and RS485 |
| Operator push-buttons | 4      | 6      |
| Optional remote operator push-buttons | 6      | 6      |
| Solid state outputs | 2      | 2      |
| Options     | Etched tag plate | Tag Strip |
The BA484D is an intrinsically safe instrument that can display text and simple graphics in a hazardous area. Incorporating six push-buttons and two solid state outputs, the BA484D is a low cost operator interface ideal for simple machine and process control applications. Incorporating Modbus, BEKA and Legacy protocol the instrument may be used for new installations or to upgrade existing intrinsically safe systems.

Data and power are supplied via a 2 wire serial data link from a galvanic isolator in the safe area. Two isolators are available, the BA201 has RS232 and RS485 safe area ports and the MTL5051 can be configured with an RS232 or an RS422 port. Both isolators can power and communicate with one or two BA484D serial text displays. Using a 3 wire system, the BA201 can power and communicate with up to four serial text displays.

The high contrast liquid crystal display incorporates a green backlight that is powered by the serial data link enabling the display to be read in all lighting conditions from full sunlight to total darkness.

Four push-buttons which may be used for operator acknowledgments or controls are included below the display. If larger industrial switches are required, up to six external push-buttons may be connected to the text display. When the remote switches are activated, the front panel push-buttons are automatically disabled.

Two isolated switch outputs, which are controlled via the serial data link, comply with the requirements for simple apparatus and may be used to switch almost any certified intrinsically safe device such as a sounder, beacon or a valve.

Nine selectable standard screen formats display one, two, three or four variables, with units of measurement, tag descriptions and bargraphs on some screens. The use of a standard display screen format greatly simplifies system design.

Modbus protocol enables up to eight process variables together with their units of measurement and tag descriptions to be displayed. When used with one of the nine standard screen formats, no programming is required apart from setting the BA484D communication parameters and writing each Modbus variable into the BA484D Modbus register address map. If a custom screen layout is required in a Modbus system this can be constructed using the BEKA protocol.

BEKA protocol enables custom screen formats to be designed and stored in non-volatile using a wide selection of lines, boxes, bargraphs and fonts. Although screens can be manually designed, free BEKA ScreenWriter software which will run on a PC simplifies the process.

Legacy protocol enables the BA484D to replace an MTL643 to provide ATEX certification and a display backlight. No software or galvanic isolator changes are required.

ATEX & FM intrinsic safety certification allows installation in most gas and dust hazardous areas. Both solid state outputs comply with the requirements for simple apparatus and may be used to switch almost any certified intrinsically safe device such as a sounder, beacon or a valve.

Scripts are a sequence of commands, downloaded to and stored in non-volatile memory by the BA484D text display, that can be executed by the instrument without intervention from the host. For example a routine may be written to monitor the instruments push-buttons and to change the displayed screen or variable depending upon which button has been operated.

Pattern matching is a powerful feature that allows the BA484D to capture and display data contained in a proprietary ASCII serial string, such as that from a weighing system or barcode reader primarily intended for printing.

The enclosure which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection. A separate terminal compartment allows the BA484D to be installed and terminated without exposing the display electronics.

To simplify system design the instruction manual is supplemented by comprehensive Modbus and programming guides plus a free instrument simulator which will run on a PC. All are available from the BEKA sales office or may be downloaded from www.beka.co.uk
### SPECIFICATION

**Display**
- Type: 120 x 64 pixel liquid crystal.
- Size: 86.5mm x 45mm.
- Backlight: Powered from serial link.

**Screens**
- Standard format: 1, 2, 3 or 4 variables plus bargraph can include:
  - units of measurement
  - tag information
- Custom format: See Programming Guide
- Hidden screen: May be written to at any time and displayed when required.

**Controls**
- Front panel: Four push-buttons which can be software interrogated.
- External switches: Control may be transferred to six external switches, front panel buttons are inhibited.
- Switch cable length: 5m max

**Outputs**
- Two software controlled switch outputs.
- Contacts: Isolated single pole solid state switch certified as simple apparatus.
  - **Ron**: less than 5Ω + 0.7V
  - **Roff**: greater than 1MΩ
  - **Ui**: 28Vdc
  - **Ii**: 200mA
  - **Pi**: 0.85W

**Data transmission**
- **Baud rate**: 0.3, 0.6, 1.2, 2.4, 4.8, 9.6 or 19.2 kbps.*
- **Cable length between isolator(s) & BA484D**: 100m max at Baud rate of 9.6 kbps*

**Address**
- **Modbus protocol**: 1 – 247
- **BEKA protocol**: 0 – 247
- **Legacy protocol**: 0 – 15

**Intrinsic safety**
- **Europe ATEX**
  - **Code**: Group II Category 1G, EEx ia IIC T5 (Tamb = -40 to 60°C) or Group II Category 1GD, T80°C IP66 EEx ia IIC T5 (Tamb = -20 to 60°C)
  - **Cert. No.**: ITS02ATEX2035
- **Location**: Gas Zone 0, 1 or 2: Dust Zone 20, 21 or 22
- **USA FM**
  - **Standard**: 3610 Entity
  - **Code**: CL I, II, III; Div 1: GP A, B, C, D, E, F & G
  - **File**: T4 @ 60°C
  - **Standard**: 3611 Nonincendive
  - **Code**: CL I: Div 2: GP A, B, C & D, T4 @ 60°C
  - **File**: T4 @ 60°C
- **Environmental**
  - **Operating temp**: -20 to 60°C (ATEX gas certification -40 to 60°C)
  - **Storage temp**: -40 to 85°C
  - **Humidity**: To 95% @ 40°C
  - **Enclosure**: IP66
  - **EMC**: In accordance with EU Directive 89/336/EEC full report available.
  - **Immunity**: No error for 10V/m field strength between 150kHz and 1GHz.
  - **Emissions**: Complies with the requirements for Class B equipment

**Mechanical**
- **Terminals**: Screw clamp for 0.5 to 1.5mm² cable.
- **Weight**: 1.6kg

**Accessories**
- **Stainless legend plate**: Stainless steel plate etched with tagging or application information secured to the front of the instrument
- **Pipe mounting kit**: BA392D or BA393
- **Modbus Guide**: May be downloaded from www.beka.co.uk
- **Programming Guide**: Instrument simulator BEKA ScreenWriter

### DIMENSIONS (mm)

![Dimensions Diagram](image)

### TERMINAL CONNECTIONS

![Connections Diagram](image)

### CONNECTION

#### 2-wire system
- Powers one or two text displays
- With MTL5025 powers up to four text displays

#### 3-wire system
- With MTL5051 serial communications isolator Input/output RS232 or RS422

### HOW TO ORDER

**Model number**: BA484D
**Certification**
- ATEX gas
- ATEX gas & dust
- FM & ATEX gas

**Accessories**
- Stainless legend plate
- Pipe mounting kit
- Programming Guide
- Instrument simulator

**Please specify if required**
- **Legend**: BA392D or BA393
- **Serial Text Display**: Modbus Guide
- **Instrument simulator for personal computer**: BEKA ScreenWriter

**Note**: Cable entries differ for FM & ATEX models

**Environment**
- **Humidity**: To 95% @ 40°C
- **Enclosure**: IP66
- **EMC**: In accordance with EU Directive 89/336/EEC full report available.
- **Immunity**: No error for 10V/m field strength between 150kHz and 1GHz.
- **Emissions**: Complies with the requirements for Class B equipment

**Mechanical**
- **Terminals**: Screw clamp for 0.5 to 1.5mm² cable.
- **Weight**: 1.6kg

**Accessories**
- **Stainless legend plate**: Stainless steel plate etched with tagging or application information secured to the front of the instrument
- **Pipe mounting kit**: BA392D or BA393
- **Modbus Guide**: May be downloaded from www.beka.co.uk
- **Programming Guide**: Instrument simulator BEKA ScreenWriter

**Please specify if required**
- **Legend**: BA392D or BA393
- **Serial Text Display**: Modbus Guide
- **Instrument simulator for personal computer**: BEKA ScreenWriter

**Custom screen design aid for personal computer**
The BA488C is an intrinsically safe instrument that can display text and simple graphics in a hazardous area. Incorporating six push-buttons and two solid state outputs, the BA488C is a low cost operator interface ideal for simple machine and process control applications. Incorporating Modbus, BEKA and Legacy protocol the instrument may be used for new installations or to upgrade existing intrinsically safe systems.

Data and power are supplied via a 2 wire serial data link from a galvanic isolator in the safe area. Two isolators are available, the BA201 has RS232 and RS485 safe area ports and the MTL5051 can be configured with an RS232 or an RS422 port. Both isolators can power and communicate with one or two BA484D serial text displays. Using a 3 wire system, the BA201 can power and communicate with up to four serial text displays.

The high contrast liquid crystal display incorporates a green backlight that is powered by the serial data link enabling the display to be read in all lighting conditions from full sunlight to total darkness.

Six push-buttons which may be used for operator acknowledgments or controls are included on the instrument front panel. If larger industrial switches are required, these may be connected to the text display rear terminals. When activated, the front panel push-buttons are automatically disabled.

Two isolated switch outputs, which are controlled via the serial data link, comply with the requirements for simple apparatus and may be used to switch almost any certified intrinsically safe device such as a sounder, beacon or a valve.

Nine selectable standard screen formats display one, two, three or four variables, with units of measurement, tag descriptions and bargraphs on some screens. The use of a standard display screen format greatly simplifies system design.

Modbus protocol enables up to eight process variables together with their units of measurement and tag descriptions to be displayed. When used with one of the nine standard screen formats, no programming is required apart from setting the BA488C communication parameters and writing each Modbus variable into the BA488C Modbus register address map. If a custom screen layout is required in a Modbus system this can be constructed using the BEKA protocol.

BEKA protocol enables custom screen formats to be designed and stored in non-volatile using a wide selection of lines, boxes, bargraphs and fonts. Although screens can be manually designed, free BEKA ScreenWriter software which will run on a PC simplifies the process.

Legacy protocol enables the BA488C to replace an MTL644 to provide ATEX certification and a display backlight. No software or galvanic isolator changes are required and the BA488C will fit into the existing panel cut-out.

ATEX & FM intrinsic safety certification allows installation in all gas hazardous areas. Both solid state outputs comply with the requirements for simple apparatus and may be used to switch almost any certified intrinsically safe device such as a sounder, beacon or a valve.

Scripts are a sequence of commands, downloaded to and stored in non-volatile memory by the BA488C text display, that can be executed by the instrument without intervention from the host. For example a routine may be written to monitor the instruments push-buttons and to change the displayed screen or variable depending upon which button has been operated.

Pattern matching is a powerful feature which allows the BA488C to capture and display data contained in a proprietary ASCII serial string, such as that from a weighing system or barcode reader primarily intended for printing.

The front panel of the BA488C has IP66 protection and a neoprene gasket seals the joint between the text display and the panel, making it suitable for use in areas that will be hosed.

To simplify system design the instruction manual is supplemented by comprehensive Modbus and programming guides plus a free instrument simulator which will run on a PC.

BEKA Home and Office 3 year guarantee
**SPECIFICATION**

**Display**
- Type: 120 x 64 pixel liquid crystal.
- Size: 86.5mm x 45mm.
- Backlight: Powered from serial link.

**Screens**
- Standard format: 1, 2, 3 or 4 variables plus bargraph can include:
  - units of measurement
  - tag information
- Custom format: See Programming Guide
- ASCII character set, 5 font sizes
- Hidden screen: May be written to at any time and displayed when required.

**Controls**
- Front panel: Six push-buttons which can be software interrogated. Each button function may be displayed on the screen. Buttons may be disabled.
- External switches: Control may be transferred to six external switches; front panel buttons are inhibited.
- Switch cable length: 5m max

**Outputs**
- Contacts: Two software controlled switch outputs.
- Intrinsic safety parameters:
  - \( R_{on} \) less than 5Ω + 0.7V
  - \( R_{off} \) greater than 1MΩ
- Data transmission:
  - Speed: 0.3, 0.6, 1.2, 2.4, 4.8, 9.6 or 19.2k bps.*
  - Cable length: 100m max at Baud rate of 9.6k bps*
- Intrinsic safety:
  - Europe ATEX
    - EN50020:2002
    - ENEx ia IIC T5
    - Ex02E2037 2 wire system
    - Ex02E2038 3 wire system
    - Ex02E2039 4 wire system
  - Location: Zone 0, 1 or 2
  - Interface: BA201 (See datasheet)
  - or MTL5051 serial communications isolator
- USA FM
  - Standard 3610 Entity
    - Code: CL I; Div 1; GP A, B, C & D
    - File No: 3025514
  - Standard 3611 Nonincendive
    - Code: CL I; Div 2; GP A, B, C & D
    - File No: 3025514

**Environmental**
- Operating temp: -20 to +60°C (certified for use at -40°C)
- Storage temp: -40 to 85°C
- Humidity: To 95%, @ 40°C
- Enclosure: Front IP66, rear IP20
- Immunity: No error for 10V/m field strength between 150kHz and 1GHz.
- Emissions: Complies with the requirements for Class B equipment

**Mechanical**
- Terminals: Removable with screw clamp for 0.5 to 1.5mm² cable.
- Weight: 0.7kg

**Accessories**
- Tag number: Thermally printed strip on rear of instrument.
- Modbus Guide
- Programming Guide
- Instrument simulator
- May be downloaded from www.beka.co.uk

**DIMENSIONS (mm)**

- Recommended panel cut-out:
  - DIN 43 700
  - 138.0 +/-0.0 x 68.0 +/-0.7/ -0.0
  - To achieve an IP65 seal between the instrument and the panel
  - 136.0 +/-0.5/-0.0 x 66.2 +/-0.5/-0.0
  - Four panel mounting clips must be used

**TERMINAL CONNECTIONS**

**CONNECTION**

**HOW TO ORDER**

Model number
- Please specify

Accessories
- Tag strip
- Modbus Guide
- Programming Guide
- Instrument simulator
- BEKA ScreenWriter
- May be downloaded from www.beka.co.uk

Please specify if required

Legend
- Serial Text Display - Modbus Guide
- Serial Text Display – Programming Guide
- Instrument simulator for personal computer
- Custom screen design aid for personal computer
The BA684D is a dc powered instrument that can display text and simple graphics in a process area. Incorporating four push-buttons and two single pole outputs, the BA684D is a low cost robust operator interface ideal for simple machine and process control applications.

Available with either an RS485 or RS232 port and incorporating Modbus, BEKA and Legacy protocol, the BA684D may be directly connected to many industrial networks and instruments, including new installations and upgrades to existing systems.

A high contrast liquid crystal display incorporates a green backlight allowing the display to be read in all lighting conditions from full sunlight to total darkness. The BA684D text display is therefore suitable for mounting in almost any process location.

Four push-buttons, which may be used for operator acknowledgments or controls, are mounted on the instrument front panel below the display. If larger industrial switches are required for operator acknowledgements, these may be connected to the text display terminals. When external switches are activated, the front panel push-buttons are automatically disabled.

Two switch outputs, which are controlled via the serial data link, may be used to control a small load such as a valve, actuator or sounder.

Standard screen formats contain one, two, three or four variables, together with units of measurement, tag descriptions and bargraphs on some of the screens. Use of one of these nine standard screens greatly reduces the amount of programming required and will satisfy most display requirements. If a custom screen layout is required in a Modbus system this can be constructed using the BEKA protocol.

BEKA protocol allows custom screens using five different font sizes together with, lines, boxes and bargraphs to be produced and stored in non-volatile memory. Simple bit map graphics may be downloaded and stored. Information can also be written to a hidden screen that may be displayed when required.

Legacy protocol enables the BA684D to replace an MTL643 for safe area applications without the need for a galvanic communications isolator and with the added advantage of a display backlight. If required, simple modifications to the host software will allow the enhanced features of the BA684D to be used i.e. five font sizes, simple graphics, additional operator buttons and a second solid state output.

Scripts are a sequence of commands, downloaded to and stored in non-volatile memory by the BA684D text display, that can be executed by the instrument without intervention from the host. For example, a routine may be written to monitor the instruments push-buttons and to change the displayed screen or variable depending upon which button has been operated.

Pattern matching is a powerful feature that allows the BA684D to capture and display data contained in a proprietary ASCII serial string, such as that from a weighing system or barcode reader primarily intended for printing.

The robust enclosure which is moulded in glass reinforced polyester (GRP), has stainless steel fittings, silicone gaskets and an armoured glass window. Its robust construction provides IP66 protection. A separate terminal compartment allows the BA684D to be installed and terminated without exposing the display electronics.

To simplify system design the instruction manual is supplemented by comprehensive Modbus and programming guides plus a free instrument simulator which will run on a PC. All are available from the BEKA sales office or may be downloaded from www.beka.co.uk
## Specification

### Power Supply
- **Voltage**: 20 to 36V dc
- **Current**: 95mA max

### Display
- **Type**: 120 x 64 pixel backlit liquid crystal
- **Size**: 86.5 x 45mm
- **Screens**: 9 standard formats, 1, 2, 3 or 4 variables plus units of measurement & tag information, some include bargraphs.
- **Custom format**: See Programming Guide
- **Hidden screen**: May be written to at any time and displayed when required.

### Controls
- **Front panel**: Four push-buttons which can be software interrogated.
- **External switches**: Control may be transferred to six external switches, front panel buttons are inhibited.
- **Switch cable length**: 5m max

### Outputs
- **Rating**: 250V; 5A ac
- **Power supply**: 30V; 5A ac
- **Reactive loads must be suppressed

### Data Transmission
- **Speed**: 0.3, 0.6, 1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 67.6 & 115.2k bps.
- **Format**: 1 or 2 stop bits; odd, even or no parity bit; 7 or 8 data bits.
- **Protocol**: Selectable Modbus, BEKA or Legacy that is compatible with the MTL643 & MTL644

### Address
- **Modbus protocol**: 1 – 247
- **BEKA protocol**: 0 – 247
- **Legacy protocol**: 0 – 15

### Environmental
- **Operating temp**: -20 to 60°C
- **Storage temp**: -40 to 85°C
- **Humidity**: To 95% @ 40°C
- **Enclosure**: IP66
- **EMC**: In accordance with EU Directive 89/336/EEC full report available.
- **Immunity**: No error for 10V/m field strength between 150kHz and 1GHz.
- **Emissions**: Complies with the requirements for Class B equipment

### Mechanical
- **Terminals**: Screw clamp for 0.5 to 1.5mm² cable.
- **Weight**: 1.6kg

### Accessories
- **Stainless legend plate**: Stainless steel plate etched with tagging or applicational information secured to the front of the instrument
- **Pipe mounting kit**: BA392D or BA393
- **Modbus Guide**: May be downloaded from www.beka.co.uk
- **Programming Guide**: BEKA ScreenWriter
- **Instrument simulator**: Instrument simulator for personal computer

## Dimensions (mm)

### TERMINAL CONNECTIONS

### CONNECTION for RS485 and RS232

### HOW TO ORDER

- **Model number**: Please specify
- **Communication port**: BA684D or BA392D
- **Stainless legend plate**: Please specify if required
- **Pipe mounting kit**: Legend
- **Modbus Guide**: BA392D or BA393
- **Programming Guide**: Serial Text Display - Modbus Guide
- **Instrument simulator**: Instrument simulator for personal computer
- **BEKA ScreenWriter**: Custom screen design aid for personal computer
The BA688C is a dc powered instrument that can display text and simple graphics in a process area. Incorporating six push-buttons and two single pole outputs, the BA688C is a robust low cost operator interface ideal for simple machine and process control applications.

Available with either an RS485 or RS232 port and incorporating Modbus, BEKA and Legacy protocol, the BA688C may be directly connected to many industrial networks and instruments, including new installations and upgrades to existing systems.

A high contrast liquid crystal display incorporates a green backlight allowing the display to be read in all lighting conditions from full sunlight to total darkness. The text display is therefore suitable for mounting in control panels or incorporated into measuring instruments.

Six push-buttons which may be used for operator acknowledgments or controls are included on the instrument front panel. If larger industrial switches are required, these may be connected to the text display rear terminals. When activated, the front panel push-buttons are automatically disabled.

Two single pole switch outputs, which are controlled via the serial data link, may be used to switch a small load such as a valve, actuator or sounder.

Standard screen formats contain one, two, three or four variables, together with units of measurement, tag descriptions and bargraphs on some of the screens. Use of one of these nine standard screens greatly reduces the amount of programming required and will satisfy most display requirements. If a custom display format is required, this can be developed using BEKA protocol.

Modbus protocol enables up to eight process variables together with their units of measurement and tag descriptions to be displayed. When used with one of the nine standard screen formats, no programming is required apart from setting the BA688C communication parameters and writing each Modbus variable into the BA688C Modbus register address map. If a custom screen layout is required in a Modbus system this can be constructed using the BEKA protocol.

BEKA protocol enables custom screen formats to be designed and stored in non-volatile using a wide selection of lines, boxes, bargraphs and fonts. Although screens can be manually designed, free BEKA ScreenWriter software which will run on a PC simplifies the process.

Legacy protocol enables the BA688C to replace an MTL644 for safe area applications without the need for a galvanic communications isolator and with the added advantage of a display backlight. No software changes are required and the BA688C will fit into the existing panel cut-out. If required, simple modifications to the host software will allow the enhanced features of the BA688C to be used i.e. five font sizes, simple graphics, additional operator buttons and a second output.

Scripts are a sequence of commands, downloaded to and stored in non-volatile memory by the BA688C text display, that can be executed by the instrument without intervention from the host. For example a routine may be written to monitor the instruments push-buttons and to change the displayed screen or variable depending upon which button has been operated.

Pattern matching is a powerful feature which allows the BA688C to capture and display data contained in a proprietary ASCII serial string, such as that from a weighing system or barcode reader primarily intended for printing.

The front panel of the BA688C has IP66 protection and a neoprene gasket seals the joint between the text display and the panel, making it suitable for use in areas that will be hosed.

To simplify system design the instruction manual is supplemented by comprehensive Modbus and programming guides plus a free instrument simulator which will run on a PC. All are available from the BEKA sales office or may be downloaded from www.beka.co.uk
### Power supply
- Voltage: 20 to 36V dc
- Current: 95mA max

### Display
- **Type**: 120 x 64 pixel backlit liquid crystal
- **Size**: 86.5 x 45mm
- **Screens**:
  - 9 standard formats: 1, 2, 3 or 4 variables plus units of measurement & tag information, some include bargraphs.
  - Custom format: See Programming Guide
  - Hidden screen: May be written to at any time and displayed when required.

### Controls
- **Front panel**: Six push-buttons which can be software interrogated. Each button function may be displayed on the screen. Buttons may be disabled.
- **External switches**: Control may be transferred to six external switches; front panel buttons are inhibited.
  - **Switch cable length**: 5m max
- **Outputs**: Two software controlled single pole relay contacts
- **Rating**:
  - 250V: 5A ac
  - 30V: 5A dc
  - Reactive loads must be suppressed

### Data transmission
- **Speed**: 0.3, 0.6, 1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 67.6 & 115.2 kbps
- **Format**: 1 or 2 stop bits; odd, even or no parity bit; 7 or 8 data bits.
- **Protocol**: Selectable Modbus, BEKA or Legacy that is compatible with the MTL643 & MTL644.

### Address
- **Modbus protocol**: 1 – 247
- **BEKA protocol**: 0 – 247
- **Legacy protocol**: 0 – 15
  - Zero reserved for single instrument applications

### Environmental
- **Operating temp**: -20 to +60°C
- **Storage temp**: -40 to +85°C
- **Humidity**: To 95% @ 40°C
- **Enclosure**: Front IP66, rear IP20
- **EMC**: In accordance with EU Directive 89/336/EEC full report available.
- **Immunity**: No error for 10V/m field strength between 150kHz and 1GHz.
- **Emissions**: Complies with the requirements for Class B equipment

### Mechanical
- **Terminals**: Removable with screw clamp for 0.5 to 1.5mm² cable.
- **Weight**: 0.7kg

### Accessories
- **Tag number**: Thermally printed strip on rear of instrument.
- **Modbus Guide**: May be downloaded from www.beka.co.uk
- **Programming Guide**: Custom screen design aid for personal computer

### SPECIFICATION DIMENSIONS (mm)

![Panel cut-out diagram]

**Recommended panel cut-out**
- DIN 43 700
- 138.0 +1.0/ -0.0 x 68.0 +0.7/ -0.0

To achieve an IP65 seal between the instrument and the panel
- 136.0 +0.5/-0.0 x 66.2 +0.5/-0.0

Four panel mounting clips must be used

### TERMINAL CONNECTIONS

**CONNECTION for RS485 and RS232**

![Connection diagram]

**HOST CONNECTIONS**
- RS485
- RS232
- Power

**Connections for RS485 communication**

**Connections for RS232 communication**

### HOW TO ORDER

Please specify:
- **Model number**: BA688C
- **Communication port**: RS485 or RS232
- **Accessories**
  - **Tag number**: Please specify if required
  - **Modbus Guide**: Legend
  - **Programming Guide**: Serial Text Display – Modbus Guide
  - **Instrument simulator**: Serial Text Display – Programming Guide

Instrument simulator for use on personal computer
The **BA201 communications isolator** is a dedicated interface for connecting intrinsically safe BEKA Serial Text Displays to a safe area computer system. The isolator provides intrinsically safe galvanic isolation between the safe and hazardous areas, plus conversion of the RS232 or RS485 safe area serial data to the dedicated communications signalling required by BEKA Serial Text Displays.

The isolator also powers the Serial Text Displays and depending upon the wiring configuration, up to four displays may be connected to each BA201. To prevent earth loops both communications ports are functionally isolated from the BA201 power supply terminals allowing an earthed or floating supply to be used.

No configuration is required it is only necessary to connect to the required RS232 or RS485 safe area port, the isolator will automatically function at any of the serial text display communication rates between 300 and 19.2k baud. The RS485 driver turn-around is automatic and optimised for the baud rate in use. Four green LEDs on the top of the isolator indicate status. One LED shows that the device is powered; the others indicate when the RS232 port is being used and when the isolator is transmitting to, or receiving from the serial text display.

The *enclosure*, which is moulded in ABS and polycarbonate, is DIN rail mounting and only 22.6mm wide making it compatible with many proprietary galvanic isolators and Zener barriers.

**ATEX intrinsic safety certification** permits a BA201 isolator mounted in a safe area to power and communicate with up to four BEKA serial text displays mounted in a hazardous areas. Either BA484D field mounting or BA488C panel mounting models text displays may be used, or both models may be connected to one system.

**FM, CFM and IECEx approvals** allow installation in the USA, Canada plus the growing number of countries accepting IECEx certificates which already includes Australia, New Zealand and Singapore.
**SPECIFICATION**

**Power supply**
- Voltage: 20 – 35V dc
- Current: 100mA typical at 24V powering two Text Displays in a three wire system.

**Safe area communication**
- Port: RS232 or RS485
- Unused port should not be connected.

**Intrinsic safety**
- **Europe ATEX**
  - Standard: EN50020:2002
  - Code: Group II Category 1G [EEx ia] IIC
  - Cert. No.: Anticipated Aug. 2007
- **intrinsic safety parameters**
  - Terminal 1 wrt Terminal 3
    - \( U_0 = 21.2 \text{V} \)
    - \( I_0 = 96 \text{mA} \)
    - \( P_0 = 0.51 \text{W} \)
  - Terminal 2 wrt Terminal 3
    - \( U_0 = 13.7 \text{V} \)
    - \( I_0 = 96 \text{mA} \)
    - \( P_0 = 0.51 \text{W} \)

**Location**
- Safe area

**USA FM**
- **Standard**: 3610 Entity
- **Code**: IS circuit CL1, II, III; Div 1; GP A, B, C, D, E, F & G.
- **File**: Anticipated Aug. 2007

**International IECEx**
- **Standard**: IEC60079-11:2001
- **Code**: [Ex ia] IIC
- **Cert. No.**: Anticipated Aug. 2007

**Environmental**
- Operating temp: -20 to +70°C (Certified for use at -40°C)
- Storage temp: -40 to +65°C
- Humidity: To 95% @ 40°C noncondensing
- Enclosure: Polycarbonate and ABS moulding IP20
  - Operates normally with conducted 3Vrms interference between 0.15kHz and 80MHz, or Radiated 10V/m interference between 80MHz and 1GHz.
  - Emissions: CISPR 16-1/2 Class A

**Mechanical**
- Terminals: Screw clamp for 0.5 to 1.5mm² cable.
- Removable terminal blocks.
- Colour: Hazardous area wiring blue
- Mounting: TS-35 DIN rail
- Weight: 0.15kg

**Accessories**
- Tag number: Thermally printed strip on top of instrument.

**NUMBER OF TEXT DISPLAYS**
The BA201 can power and communicate with multiple BA484D or BA488C Serial Text Displays, the maximum number depends upon the wiring configuration.

**Two-wire connection**

<table>
<thead>
<tr>
<th>No. of Text Displays</th>
<th>Backlight brilliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Full</td>
</tr>
<tr>
<td>2</td>
<td>Reduced</td>
</tr>
</tbody>
</table>

**Three-wire connection**

<table>
<thead>
<tr>
<th>No. of Text Displays</th>
<th>Backlight brilliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Full</td>
</tr>
<tr>
<td>2</td>
<td>Full</td>
</tr>
<tr>
<td>3</td>
<td>Reduced</td>
</tr>
<tr>
<td>4</td>
<td>Reduced</td>
</tr>
</tbody>
</table>

**HOW TO ORDER**
- **Model number**: BA201
- **Accessories**: Please specify if required
  - Tag strip: Legend

---

**DIMENSIONS (mm)**

**TERMINAL CONNECTIONS**
- **Hazardous area terminals**
  - Power + signal
  - Power supply
  - Safe area terminals
  - BA201

**SYSTEM CONNECTIONS**
- **2-wire system**
- **3-wire system**
- **BA484D**
  - Serial text display
  - Optional external switches
- **BA488C**
  - Serial text display
  - Optional external switches
These are second generation, easy to use flow batch controllers ideal for accurately dispensing liquids, solids or components in hazardous and safe areas. Three galvanically isolated control outputs enable one, two or even three stage control to be performed. Additional outputs are available as factory fitted options. Up to nine setpoints may be pre-entered and named for easy operator selection.

All models accept a pulse or 4/20mA input and incorporate a square root extractor plus a sixteen point adjustable lineariser, making the controllers usable with most flowmeters. The user screens, which may be in English, French or German, can be selected so that only essential information is presented to the operator.

To select the model for your application, please refer to the summary on the following page.
Select a flow batch controller for your application from:

### Intrinsically safe models

<table>
<thead>
<tr>
<th>Model</th>
<th>BA454D</th>
<th>BA458C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page no.</td>
<td>139</td>
<td>141</td>
</tr>
<tr>
<td>Mounting</td>
<td>Field</td>
<td>Panel</td>
</tr>
<tr>
<td>Protection</td>
<td>IP66</td>
<td>Front IP65 Rear IP20</td>
</tr>
<tr>
<td>Certification</td>
<td>ATEX Group II, Category 1G or ATEX Group II, Category 1GD</td>
<td></td>
</tr>
<tr>
<td>Outputs</td>
<td>3 galvanically isolated single pole, solid state switches which may be individually configured as control or status outputs.</td>
<td></td>
</tr>
<tr>
<td>Options</td>
<td>3 additional galvanically isolated single pole, solid state switches which may be individually configured as control or status outputs. Etched tag plate Tag Strip</td>
<td></td>
</tr>
</tbody>
</table>

### General purpose models

<table>
<thead>
<tr>
<th>Model</th>
<th>BA654D</th>
<th>BA658C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page no.</td>
<td>143</td>
<td>145</td>
</tr>
<tr>
<td>Mounting</td>
<td>Field</td>
<td>Panel</td>
</tr>
<tr>
<td>Protection</td>
<td>IP66</td>
<td>Front IP65 Rear IP20</td>
</tr>
<tr>
<td>Certification</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Outputs</td>
<td>3 single pole relay contacts which may be individually configured as control or status outputs.</td>
<td></td>
</tr>
<tr>
<td>Options</td>
<td>3 additional galvanically isolated single pole, solid state switches which may be individually configured as control or status outputs. Etched tag plate Tag Strip</td>
<td></td>
</tr>
</tbody>
</table>
The BA454D is an intrinsically safe, second generation batch controller based on the successful BA350B. This field mounting controller is ideal for accurately dispensing liquids, solids or components in a hazardous area and despite its sophisticated control functions, it is easy to use and configure. Carefully designed display screens are annotated in English, French, or German, lead the user intuitively through the available options. The BA454D accepts a pulse or 4/20mA analogue input and incorporates a square root extractor and sixteen point lineariser allowing use with almost any flowmeter or sensor. Separate total and rate scaling factors enable the dispensed quantity and the rate of dispensing to be displayed in the same or in different engineering units.

Single or two-stage control can be performed by the BA454D with a third output available to control an additional valve or pump. To ensure maximum accuracy, overrun compensation may be selected to automatically minimise batching errors caused by actuator delays.

The backlit display is readable in all lighting conditions. The user screen may be selected so that the operator is only presented with essential process information. Variables that may be displayed include dispensed quantity, batch setpoint, rate of dispensing and controller status. Most of the standard display screens also include a bargraph showing batch progress. A record of total product dispensed is maintained as a grand total together with a history of the last ten batches.

Up to nine setpoints may be pre-entered and selected by the operator when required. To simplify selection, each setpoint may be identified by a plain language name having up to sixteen alphanumeric characters.

The three isolated outputs are individually configured as control or status outputs. If more are required, a factory fitted option provides three additional identical isolated outputs.

Front panel push buttons allow the operator to start and stop the batch and to reset the controller at the end of each cycle. For applications where large or remote push buttons are required, control may be transferred to external switches with or without inhibiting the front panel controls.

Counting may be inhibited during a batch by closing an external contact. Thus product may be re-cycled whilst being heated, or the batching system may be purged without affecting the quantity dispensed.

Selectable automatic restart causes the BA454D batch controller to execute the batching operation a pre-set number of times. The delay between batches may be set between 1 second and 24 hours, thus enabling the controller to perform regular dosing and sampling operations.

ATEX certification permits the BA454D to be installed in gas and dust hazardous areas. The magnetic pick-off, voltage pulse and 4/20mA inputs comply with the requirements for simple apparatus, allowing direct connection to most certified flowmeters. Switch contacts and a wide range of certified proximity detectors may also be directly connected to the BA454D. All three control outputs are galvanically isolated and certified as separate intrinsically safe circuits with output parameters complying with the requirements for simple apparatus. This allows most certified hazardous area loads such as valves, lamps, and sounders to be controlled, or the output may be transferred to the safe area via a wide range of Zener barriers or galvanic isolators.

Controller configuration may be performed via the front panel push buttons or optional external switches. To prevent accidental or unauthorised adjustment, access to the configuration menus is restricted by an external security link and an optional user definable four digit security code.

Supply overload protection prevents the batch controller being damaged if it is directly connected to a dc supply without a Zener barrier or galvanic isolator, thus eliminating a common cause of failure during commissioning and maintenance.

The GRP enclosure has stainless steel fittings, neoprene gaskets and an armoured glass window. The robust construction provides IP66 protection which has been independently assessed by ITS – report available. A separate terminal compartment allows the instrument to be installed and terminated without exposing the electronic assembly. To further simplify field wiring and subsequent inspection, the terminal cable entries and clamping screws are both forward facing.
**SPECIFICATION**

**Power supply**

**Voltage**
- Must be powered via a Zener barrier or galvanic isolator, 11V min required between terminals 1 and 2.

**Current**
- 33 mA typical when powered from 24V via 28V 300Ω Zener barrier

**Pulse inputs**

**Switch contact**
- Linear or via 16 point lineariser

**Closed**
- Less than 100Ω

**Open**
- Greater than 1kΩ

**Proximity detector**
- 2-wire NAMUR

**Magnetic pick-off**
- 40mV peak to peak min

**Voltage pulse (low)**
- Low: Less than 1V
- High: Greater than 3V; 30V max.

**Voltage pulse (high)**
- Low: Less than 3V
- High: Greater than 10V; 30V max.

**Open collector**
- Closed: Less than 2kΩ
- Open: Greater than 10kΩ

**Frequency**
- Switch contact: 100Hz maximum
- All other pulse I/P: 5kHz maximum

**4/20mA input**

**Voltage drop**
- Linear or root extracting 0.6V at 20mA

**Accuracy at 20°C**
- Linear: ±16 μA at input ±0.3% of span
- Root extracting: ±0.25%/°C

**Proximity detector**
- 2-wire NAMUR

**Magnetic pick-off**
- 40mV peak to peak min

**Voltage pulse (low)**
- Low: Less than 1V
- High: Greater than 3V; 30V max.

**Voltage pulse (high)**
- Low: Less than 3V
- High: Greater than 10V; 30V max.

**Open collector**
- Closed: Less than 2kΩ
- Open: Greater than 10kΩ

**Frequency**
- Switch contact: 100Hz maximum
- All other pulse I/P: 5kHz maximum

**Display**

**Size**
- 86.5 mm x 45 mm LCD

**Backlight**
- Green

**6 Selectable operator screens showing**
- combinations of: Batch controller status
- Quantity dispensed
- Batch setpoint
- Rate of dispensing
- Status of control outputs

**Outputs**

**Three galvanically isolated solid state**
- dc switches.

**On**
- Less than 5Ω + 0.7V

**Off**
- Greater than 1MΩ

**IS parameters**
- U(i)=28V; I(i)=200mA; Pi=0.85W

**Switching time**
- 0.2s max

**Control 1**
- Closes when start button is operated and opens when dispensed quantity equals the batch setpoint.

**Outputs 2 & 3**
- Closes when start button is operated and opens when dispensed quantity equals the batch setpoint.

**Flow alarm**
- Closes when the rate of dispensing falls below a pre-set value. Also causes batch controller to pause.

**Reset status**
- Closes when controller is reset and opens when batch is started.

**Batch status**
- Opens when batch is started and closes when batch is complete.

**Pulse output**
- Scaled number of pulses proportional to quantity dispensed. Frequency 4 Hz max.

**Front panel push buttons**

(Control may be transferred to external switches with or without disabling the front panel push buttons.)

**Start**
- Energises Control 1

**Stop**
- During a batch de-energises Control 1, 2 & 3 causing the batch to pause.

**Reset**
- Resets the batch display to zero or to the batch setpoint if the controller is counting down.

**Menu**
- Provides access to four functions if they are enabled:
  - Select pre-entered batch setpoint
  - Adjust batch setpoint
  - View size of last 10 batches
  - Configuration menu

**Security**

**Operator menu**
- May be protected by an optional four digit code.

**Configuration menus**
- Protected by external link or switch, plus optional four digit code.

**Intrinsic safety**

**Europe ATEX**
- Standard: EN50020:2002
- Code: Group II Category 1G, Ex ia IIC T5 (Tamb = -40 to 60˚C)
- or
- Code: Group II Category 1GD, T80˚C IP66 Ex ia IIC T5 (Tamb = -20 to 60˚C)
- Cert. No.: ITS03ATEX21378 System Ex03E21380 & Ex03E21381
- Location: Gas Zone 0, 1 or 2; Dust Zone 20, 21 or 22

**Environmental**

**Operating temp**
- -20 to 60˚C (ATEX gas certification-40 to 60˚C)

**Storage temp**
- -40 to 85˚C

**Humidity**
- To 95% @ 40˚C

**Enclosure**
- IP66

**EMC**
- In accordance with EU Directive 89/336/EEC

**Immunity**
- No error for 10V/m field strength between 150kHz and 1GHz.

**Emissions**
- Complies with the requirements for Class B equipment.

**Mechanical**

**See page 147 for enclosure & terminal details.**

**Terminals**
- Screw clamp for 0.5 to 1.5mm 2 cable.

**Weight**
- 1.6 kg

**Accessories**

**Additional outputs**
- Three programmable outputs having the same specification as outputs 2 & 3.

**Stainless legend plate**
- Stainless steel plate secured to front of instrument etched with tagging or applicational information.

**Pipe mounting kit**
- BA392D or BA393

**H O W T O O R D E R**

**Power supply**
- Voltage: Must be powered via a Zener barrier or galvanic isolator, 11V min required between terminals 1 and 2.

**Current**
- 33 mA typical when powered from 24V via 28V 300Ω Zener barrier

**Pulse inputs**

**Switch contact**
- Linear or via 16 point lineariser

**Closed**
- Less than 100Ω

**Open**
- Greater than 1kΩ

**Proximity detector**
- 2-wire NAMUR

**Magnetic pick-off**
- 40mV peak to peak min

**Voltage pulse (low)**
- Low: Less than 1V
- High: Greater than 3V; 30V max.

**Voltage pulse (high)**
- Low: Less than 3V
- High: Greater than 10V; 30V max.

**Open collector**
- Closed: Less than 2kΩ
- Open: Greater than 10kΩ

**Frequency**
- Switch contact: 100Hz maximum
- All other pulse I/P: 5kHz maximum

**4/20mA input**

**Voltage drop**
- Linear or root extracting 0.6V at 20mA

**Accuracy at 20°C**
- Linear: ±16 μA at input ±0.3% of span
- Root extracting: ±0.25%/°C

**Display**

**Size**
- 86.5 mm x 45 mm LCD

**Backlight**
- Green

**6 Selectable operator screens showing**
- combinations of: Batch controller status
- Quantity dispensed
- Batch setpoint
- Rate of dispensing
- Status of control outputs

**Outputs**

**Control 1**
- Closes when start button is operated and opens when dispensed quantity equals the batch setpoint.

**Outputs 2 & 3**
- Closes when start button is operated and opens when dispensed quantity equals the batch setpoint.

**Flow alarm**
- Closes when the rate of dispensing falls below a pre-set value. Also causes batch controller to pause.

**Reset status**
- Closes when controller is reset and opens when batch is started.

**Batch status**
- Opens when batch is started and closes when batch is complete.

**Pulse output**
- Scaled number of pulses proportional to quantity dispensed. Frequency 4 Hz max.

**Front panel push buttons**

(Control may be transferred to external switches with or without disabling the front panel push buttons.)

**Start**
- Energises Control 1

**Stop**
- During a batch de-energises Control 1, 2 & 3 causing the batch to pause.

**Reset**
- Resets the batch display to zero or to the batch setpoint if the controller is counting down.

**Menu**
- Provides access to four functions if they are enabled:
  - Select pre-entered batch setpoint
  - Adjust batch setpoint
  - View size of last 10 batches
  - Configuration menu

**Security**

**Operator menu**
- May be protected by an optional four digit code.

**Configuration menus**
- Protected by external link or switch, plus optional four digit code.

**Intrinsic safety**

**Europe ATEX**
- Standard: EN50020:2002
- Code: Group II Category 1G, Ex ia IIC T5 (Tamb = -40 to 60˚C)
- or
- Code: Group II Category 1GD, T80˚C IP66 Ex ia IIC T5 (Tamb = -20 to 60˚C)
- Cert. No.: ITS03ATEX21378 System Ex03E21380 & Ex03E21381
- Location: Gas Zone 0, 1 or 2; Dust Zone 20, 21 or 22

**Environmental**

**Operating temp**
- -20 to 60˚C (ATEX gas certification-40 to 60˚C)

**Storage temp**
- -40 to 85˚C

**Humidity**
- To 95% @ 40˚C

**Enclosure**
- IP66

**EMC**
- In accordance with EU Directive 89/336/EEC

**Immunity**
- No error for 10V/m field strength between 150kHz and 1GHz.

**Emissions**
- Complies with the requirements for Class B equipment.

**Mechanical**

**See page 147 for enclosure & terminal details.**

**Terminals**
- Screw clamp for 0.5 to 1.5mm 2 cable.

**Weight**
- 1.6 kg

**Accessories**

**Additional outputs**
- Three programmable outputs having the same specification as outputs 2 & 3.

**Stainless legend plate**
- Stainless steel plate secured to front of instrument etched with tagging or applicational information.

**Pipe mounting kit**
- BA392D or BA393
The BA458C is an intrinsically safe second-generation flow batch controller that supersedes the successful BA350BP and BA350BC. This controller is ideal for accurately dispensing liquids, solids or components in a hazardous area and despite its sophisticated control functions, it is very easy to configure and use. Carefully designed display screens, annotated in English, French, or German, lead the user intuitively through the available options. The BA458C accepts a pulse or 4/20mA analogue input and incorporates a square root extractor and sixteen point lineariser allowing use with almost any flowmeter or sensor. Separate total and rate scaling factors enable the dispensed quantity and the rate of dispensing to be displayed in the same or in different engineering units.

Single or two-stage control can be performed by the BA458C with a third output available to control an additional valve or pump. To ensure maximum accuracy, overrun compensation may be selected to automatically minimise batching errors caused by actuator delays.

The backlit display is readable in all lighting conditions. The user screen may be selected so that the operator is only presented with essential process information. Variables that may be displayed include dispensed quantity, batch setpoint, rate of dispensing and controller status. Most of the standard display screens also include a bargraph showing batch progress. A record of total product dispensed is maintained as a grand total together with a history of the last ten batches.

Up to nine setpoints may be pre-entered and selected by the operator when required. To simplify selection, each setpoint may be identified by a plain language name having up to sixteen alphanumeric characters.

The three isolated outputs are individually configured as control or status outputs. If more are required, a factory fitted option provides three additional identical isolated outputs.

Front panel push buttons allow the operator to start and stop the batch and to reset the controller at the end of each cycle. For applications where large or remote push buttons are required, control may be transferred to external switches with or without inhibiting the front panel controls.

Counting may be inhibited during a batch by closing an external contact. Thus product may be re-cycled whilst being heated, or the batching system may be purged without affecting the quantity dispensed.

Selectable automatic restart causes the BA458C batch controller to execute the batching operation a pre-set number of times. The delay between batches may be set between 1 second and 24 hours, thus enabling the controller to perform regular dosing and sampling operations.

ATEX certification permits the BA458C to be installed in all hazardous gas areas. The magnetic pick-off, voltage pulse and 4/20mA inputs comply with the requirements for simple apparatus, allowing direct connection to most certified flowmeters. Switch contacts and a wide range of certified proximity detectors may also be directly connected to the BA458C. All three control outputs are galvanically isolated and certified as separate intrinsically safe circuits with output parameters complying with the requirements for simple apparatus. This allows most certified hazardous area loads such as valves, lamps, and sounders to be controlled, or the output may be transferred to the safe area via a wide range of Zener barriers or galvanic isolators.

Controller configuration may be performed via the front panel push buttons or optional external switches. To prevent accidental or unauthorised adjustment, access to the configuration menus is restricted by an external security link and an optional user definable four digit security code.

Supply overload protection prevents the batch controller being damaged if it is directly connected to a dc supply without a Zener barrier or galvanic isolator, thus eliminating a common cause of failure during commissioning and maintenance.

For field mounting applications the BA454D provides the same batching facilities but is housed in a robust IP66 GRP enclosure suitable for external mounting. A complementary range of non-certified models for use in safe areas is also available.
Flow batch controllers

- **Reset status**: Closes when controller is reset and opens when batch is started.
- **Batch status**: Opens when batch is started and closes when batch is complete.
- **Pulse output**: Scaled number of pulses proportional to quantity dispensed. Frequency 4 Hz max.

Front panel push buttons

(Control may be transferred to external switches with or without disabling the front panel push buttons.)

- **Start**: Energises Control 1
- **Stop**: During a batch de-energises Control 1, 2 & 3 causing the batch to pause.
- **Reset**: Resets the batch display to zero or to the batch setpoint if the controller is counting down.
- **Menu**: Provides access to four functions if they are enabled:
  - Select pre-entered batch setpoint
  - Adjust batch setpoint
  - View size of last 10 batches
  - Configuration menu

Security

- **Operator menu**: May be protected by an optional four digit code.
- **Configuration menu**: Protected by external link or switch, plus optional four digit code.

Intrinsic safety

**Europe ATEX**

- **Standard**: EN50020:2002
- **Code**: Group II Category 1G
- **Ex ia IIC T5**
- **Cert. No.**: ITS03ATEX21379
- **System**: Ex03E21380 & Ex03E21381
- **Location**: Zone 0, 1 or 2

Environmental

- **Operating temp**: -20 to +60°C (certified for use at -40°C)
- **Storage temp**: -40 to 85°C
- **Humidity**: To 95% @ 40°C
- **Enclosure**: Front IP66, rear IP20
- **EMC**: In accordance with EU Directive 89/336/EEC
- **Immunity**: No error for 10V/m field strength between 150kHz and 1GHz.
- **Emissions**: Complies with the requirements for Class B equipment.

Mechanical

- **See page 148 for enclosure & terminal details**
- **Terminals**: Removable with screw clamp for 0.5 to 1.5mm² cable.
- **Weight**: 0.7 kg

Accessories

- **Three programmable outputs having the same specification as outputs 2 & 3.**
- **Thermally printed strip on rear of instrument.**

**SPECIFICATION**

**Power supply**

- **Voltage**
  
  Must be powered via a Zener barrier or galvanic isolator, 11V min required between terminals 1 and 2.

- **Current**

  33 mA typical when powered from 24V via 28V 300Ω Zener barrier

**Pulse inputs**

- **Switch contact**

  - **Closed**
    
    Less than 100Ω

  - **Open**
    
    Greater than 1kΩ

- **Proximity detector**

  2-wire NAMUR

- **Magnetic pick-off**

  40mV peak to peak min

- **Voltage pulse (low)**

  - **Low**
    
    Less than 1V

  - **High**
    
    Greater than 3V; 30V max.

- **Voltage pulse (high)**

  - **Low**
    
    Less than 3V

  - **High**
    
    Greater than 10V; 30V max.

- **Open collector**

  - **Closed**
    
    Less than 2kΩ

  - **Open**
    
    Greater than 10kΩ

- **Frequency**

  Switch contact: 100Hz maximum

  All other pulse I/P: 5kHz maximum

- **4/20mA input**

  Linear or root extracting

  - **Voltage drop**
    
    0.6V at 20mA

  - **Accuracy at 20°C**
    
    Linear 0.3 % of span

  - **Root extracting**
    
    ±16 μA at input ±0.3 % of span

  - **Frequency**
    
    2Hz maximum

  - **Temperature effect**
    
    Less than 0.025%/°C

- **Inhibit**

  Linking terminals 18 & 20 prevents input signal being counted.

- **Display**

  - **Size**
    
    86.5 mm x 45 mm LCD

  - **Backlight**
    
    Green

  - **6 selectable operator screens showing combinations of:**
    
    Batch controller status

    Quantity dispensed

    Batch setpoint

    Rate of dispensing

    Status of control outputs

- **Outputs**

  Three galvanically isolated solid state dc switches.

  - **On**
    
    Less than 5Ω + 0.7V

  - **Off**
    
    Greater than 1MΩ

  - **IS parameters**
    
    Ui=28V; Ii=200mA; Pi=0.85W

  - **Switching time**
    
    0.2s max

- **Control 1**

  Closes when start button is operated and opens when dispensed quantity equals the batch setpoint.

- **Outputs 2 & 3**

  May be configured as:

  - **Control 2 or Control 3 (parameters for each are separately adjustable)**
    
    Closes a pre-set time after Control 1 closes and opens a pre-set dispensed quantity before the dispensed quantity equals the batch setpoint.

  - **Flow alarm**
    
    Closes when the rate of dispensing falls below a pre-set value. Also causes batch controller to pause.

**Inhibit**

Linking terminals 18 & 20 prevents input signal being counted.

- **Display**

  Size 86.5 mm x 45 mm LCD

  Backlight Green

  6 selectable operator screens showing combinations of:

  - Batch controller status

  - Quantity dispensed

  - Batch setpoint

  - Rate of dispensing

  - Status of control outputs

- **Outputs**

  Three galvanically isolated solid state dc switches.

  - **On**
    
    Less than 5Ω + 0.7V

  - **Off**
    
    Greater than 1MΩ

  - **IS parameters**
    
    Ui=28V; Ii=200mA; Pi=0.85W

  - **Switching time**
    
    0.2s max

- **Control 1**

  Closes when start button is operated and opens when dispensed quantity equals the batch setpoint.

- **Outputs 2 & 3**

  May be configured as:

  - **Control 2 or Control 3 (parameters for each are separately adjustable)**
    
    Closes a pre-set time after Control 1 closes and opens a pre-set dispensed quantity before the dispensed quantity equals the batch setpoint.

  - **Flow alarm**
    
    Closes when the rate of dispensing falls below a pre-set value. Also causes batch controller to pause.

**HOW TO ORDER**

- **Model number**: Please specify

  BA458C

- **Accessories**: Please specify if required

  Additional 3 outputs

  Legend

  BA458C

  Tag strip
The BA654D is a second-generation, field mounting, general-purpose flow batch controller based on the successful BA550. This controller is ideal for accurately dispensing liquids, solids or components and despite its sophisticated control functions, it remains very easy to use and configure.

The backlit display is readable in all lighting conditions and the user screen may be selected so that the operator is only presented with essential process information. Displayed variables include dispensed quantity, batch setpoint, rate of dispensing and controller status. Most of the standard display screens also include a bargraph showing batch progress. A record of the total product dispensed is maintained as a grand total, together with a history of the last ten batches.

Up to nine setpoints may be pre-entered for selection by the operator when required. To simplify selection, each setpoint may be identified by a plain language name having up to sixteen alphanumeric characters. The controller can also be configured so that the operator can adjust an existing setpoint or enter a new value.

Single or two-stage control can be performed by the BA654D with a third output available to control an additional valve or pump, or even to provide three-stage control. To ensure maximum accuracy, overrun compensation may be selected to automatically minimise batching errors caused by actuator delays.

Pulse and analogue 4/20mA signals are accepted by the batch controller. All inputs are galvanically isolated allowing earthed or floating signals to be connected. Pulse inputs may be from switch contacts, a 2-wire proximity detector or a wide range of voltage sources. An easily adjustable sixteen-point lineariser will accurately correct almost any flowmeter non-linearity. The BA654D also incorporates a root-extractor so 4/20mA analogue inputs may be linear, or have a square law relationship with flow.

Separate total and rate scaling factors enable the dispensed quantity and the rate of dispensing to be displayed in the same or in different engineering units.

The three relay contact outputs may be individually configured as control or status outputs. If more are required, a factory fitted option provides three additional galvanically isolated solid state outputs.

Front panel push buttons allow the operator to start and stop the batch and to reset the controller at the end of each cycle. For applications where large or remote push buttons are required, control may be transferred to external switches with or without inhibiting the front panel controls.

Counting may be inhibited during a batch by closing an external contact. Thus product may be re-cycled whilst being heated, or the batching system may be purged without inhibiting the quantity dispensed.

Selectable automatic restart causes the BA654D batch controller to execute the batching operation a pre-set number of times. The delay between batches may be set between 1 second and 24 hours, thus enabling the controller to perform regular dosing and sampling operations.

Controller configuration is performed via the front panel push buttons or optional external switches. Carefully designed configuration menus lead the installer intuitively through the available functions. Configuration menus and user screens may be displayed in English, French or German.

A security link and an optional user definable four digit security code prevent accidental or unauthorised access to the configuration menus.

The enclosure, which is moulded in glass reinforced polyester (GRP), has stainless steel fittings and provides IP66 protection. A separate terminal compartment allows the instrument to be installed and terminated without exposing the instrument electronics. To further simplify installation and subsequent inspection, the terminal cable entries and the clamping screws are both forward facing.

For panel mounting applications the BA658C provides the same batching facilities as the BA654D but is housed in a 144 x 72mm DIN enclosure. A complementary range of intrinsically safe models is also available.
Flow batch controllers
Flow alarm
Closes when the rate of dispensing falls below a pre-entered value. Also causes batch controller to pause.
Reset status
Closes when controller is reset and opens when batch is started.
Batch status
Opens when batch is started and closes when batch is complete.
Pulse output
Scaled output proportional to total volume dispensed.
Frequency 4 Hz max.

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<td>Stainless legend plate</td>
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<td>Pipe mounting kit</td>
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</table>
The BA658C is a second-generation, general-purpose flow batch controller that supersedes the successful BA550P and BA550C. This controller is ideal for accurately dispensing liquids, solids or components and despite its sophisticated control functions, it remains very easy to use and configure.

The backlit display is readable in all lighting conditions. The user screen may be selected so that the operator is only presented with essential process information. Variables that may be displayed include dispensed quantity, batch setpoint, rate of dispensing and controller status. Most of the standard display screens also include a bargraph showing batch progress. A record of the total product dispensed is maintained as a grand total, together with a history of the last ten batches.

Up to nine setpoints may be pre-entered for selection by the operator when required. To simplify selection, each setpoint may be identified by a plain language name having up to sixteen alphanumeric characters. The controller can also be configured so that the operator can adjust an existing setpoint or enter a new value.

Single or two-stage control can be performed by the BA658C with a third output available to control an additional valve or pump, or even to provide three-stage control. To ensure maximum accuracy, overrun compensation may be selected to automatically minimise batching errors caused by actuator delays.

Pulse and analogue 4/20mA signals are accepted by the batch controller. All inputs are galvanically isolated from the controller power supply and outputs so that earthed signals may be connected. Pulse inputs may be from switch contacts, a 2-wire proximity detector or a wide range of voltage sources. An easily adjustable sixteen point straight line lineariser will accurately correct almost any flowmeter non-linearity. The BA658C also incorporates a root-extractor so 4/20mA analogue inputs may be linear, or have a square law relationship with the rate of flow.

Separate total and rate scaling factors enable the dispensed quantity and the rate of dispensing to be displayed in the same or in different engineering units.

The three relay contact outputs may be individually configured as control or status outputs. If more are required, a factory fitted option provides three additional galvanically isolated solid state outputs.

Front panel push buttons allow the operator to start and stop the batch and to reset the controller at the end of each cycle. For applications where large or remote push buttons are required, control may be transferred to external switches with or without inhibiting the front panel controls.

Counting may be inhibited during a batch by closing an external contact. Thus product may be re-cycled whilst being heated, or the batching system may be purged without affecting the quantity dispensed.

Selective automatic restart causes the BA658C batch controller to execute the batching operation a pre-set number of times. The delay between batches may be set between 1 second and 24 hours, thus enabling the controller to perform regular dosing and sampling operations.

Controller configuration is performed via the front panel push buttons or optional external switches. Carefully designed configuration menus lead the installer intuitively through the available functions. Configuration menus and user screens may be displayed in English, French or German.

A security link and an optional user definable four digit security code prevent accidental or unauthorised access to the configuration menus.

For field mounting applications the BA654D provides the same batching facilities as the BA658C but is housed in a robust IP66 GRP enclosure suitable for external mounting. A complementary range of field and panel mounting intrinsically safe models is also available for use in potentially flammable atmospheres.
Flow batch controllers

**Flow alarm**
Closes when the rate of dispensing falls below a pre-entered value. Also causes batch controller to pause.

**Reset status**
Closes when controller is reset and opens when batch is started.

**Batch status**
Opens when batch is started and closes when batch is complete.

**Pulse output**
Scaled output proportional to total volume dispensed.
Frequency 4 Hz max.

---

**Front panel push buttons**

- **Start**
  Energises Control 1

- **Stop**
  During a batch de-energises Control 1, 2 & 3 causing the batch to pause.

- **Reset**
  Resets the batch display to zero or to the batch setpoint if the controller is counting down.

- **Menu**
  Provides access to four functions if they are enabled:
  - Select pre-entered batch setpoint
  - Adjust batch setpoint
  - View size of last 10 batches
  - Configuration menu

**Security**

- **Operator menus**
  May be protected by an optional four digit code.

- **Configuration menus**
  Protected by external link or switch, plus optional four digit code.

**Environmental**

- **Operating temp**
  -20 to +60°C

- **Storage temp**
  -40 to 85°C

- **Humidity**
  To 95% @ 40°C

- **Enclosure**
  Front IP66, rear IP20

- **EMC**
  In accordance with EU Directive 89/336/EEC.

- **Immunity**
  No error for 10 V/m field strength between 150 kHz and 1 GHz.

- **Emissions**
  Complies with the requirements for Class B equipment.

**Mechanical**

- **See page 148 for enclosure & terminal details**

- **Terminals**
  Removable with screw clamp for 0.5 to 1.5 mm² cable.

- **Weight**
  0.7 kg

**Accessories**

- **Additional outputs**
  Three configurable galvanically isolated, single pole solid state dc switch outputs.
  Rating: 30V, 100mA dc

- **Tag Strip**
  Thermally printed strip on rear of instrument.

---

**SPECIFICATION**

**Power supply**

- **Voltage**
  20 to 36V dc.

- **Current**
  95mA max

**Pulse Inputs**

- **Switch contact**
  Linear or via 16 point lineariser

- **Closed**
  Less than 100Ω

- **Open**
  Greater than 1kΩ

- **Proximity detector**
  2-wire NAMUR

- **Magnetic pick-off**
  40mV peak to peak min

**Voltage pulse (low)**

- **Low**
  Less than 1V

- **High**
  Greater than 3V; 30V max.

**Voltage pulse (high)**

- **Low**
  Less than 3V

- **High**
  Greater than 10V; 30V max.

**Open collector**

- **Closed**
  Less than 2kΩ

- **Open**
  Greater than 10kΩ

**Frequency**

- **Switch contact**
  100Hz maximum

- **All other pulse I/P**
  5kHz maximum

**4/20mA input**

- **Linear or root extracting**
  0.6V at 20mA

- **Accuracy at 20°C**
  0.3 % of span

- **Linear root extracting**
  ±16 µA at input ±0.3 % of span

- **Temperature effect**
  Less than 0.025%/°C

- **Frequency**
  2Hz maximum

**Inhibit**

- **Linking terminals 18 & 20 prevents input signal being counted.**

**Display**

- **Size**
  86.5 mm x 45 mm LCD

- **Backlight**
  Green

- **6 selectable operator screens showing combinations of:**
  - Digital & bargraph display of quantity dispensed.
  - Batch setpoint
  - Rate of dispensing
  - Status of control outputs
  - Batch controller status

**Outputs**

- **Rating**
  Three single pole relay contacts.
  250V; 5A; 1.25kVA ac
  30V; 5A; 150W dc
  Reactive loads must be suppressed.

- **Switching time**
  0.2s max

- **Control 1**
  Closes when start button is operated and opens when batched quantity equals the batch setpoint.

**Outputs 2 & 3 may be configured as:**

- **Control 2 or Control 3 (parameters for each are individually adjustable)**
  Closes a programmable time after Control 1 closes and open a programmable dispensed quantity before the dispensed quantity equals the batch setpoint.

---

**HOW TO ORDER**

**Please specify**

- **Model number**
  BA658C

**Accessories**

- **Please specify if required**
  Additional 3 solid state dc outputs

**Legend**

- **Clicking terminals 18 & 20 prevents input signal being counted.**
### TERMINAL DESCRIPTIONS

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Symbol</th>
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<td>Power supply</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>For earthing the enclosure</td>
<td></td>
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<tr>
<td>11</td>
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<td></td>
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<td>12</td>
<td>contact or open collector</td>
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<td>13</td>
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<td></td>
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<td>14</td>
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<td></td>
</tr>
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<td>mV (Magnetic pick-off)</td>
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<td>Common for input 2</td>
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<td>Do not use</td>
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<tr>
<td>S7</td>
<td>Common for switches</td>
<td></td>
</tr>
</tbody>
</table>

### TERMINAL CONNECTIONS

- **A1**: + Control 1
- **A2**: –
- **A3**: + Output 2
- **A4**: –
- **A5**: + Output 3
- **A6**: –
- **A7**: + Output 4
- **A8**: –
- **A9**: + Output 5
- **A10**: –
- **A11**: + Output 6
- **A12**: –

**Outputs 2 and 3 may each be configured to have one of six functions.**

**If fitted optional outputs 4, 5 and 6 may each be configured to have one of six functions.**

**Note:**

BA654D: Control 1, Output 2 and Output 3 are relay contacts which are not polarised
**DIMENSIONS (mm)**

- Panel cut-out

- Recommended panel cut-out:
  - DIN 43 700
  - To achieve an IP65 seal between the instrument and the panel, 136.0 ± 0.5/0.0 x 66.2 ± 0.5/0.0 mm must be used.

**TERMINAL DESCRIPTIONS**

<table>
<thead>
<tr>
<th>Case</th>
<th>For earthing the enclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+ Power supply</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>+ Proximity detector, switch contact or open collector</td>
</tr>
<tr>
<td>12</td>
<td>- Input A</td>
</tr>
<tr>
<td>13</td>
<td>+ High voltage</td>
</tr>
<tr>
<td>14</td>
<td>+ Low voltage</td>
</tr>
<tr>
<td>15</td>
<td>mV (Magnetic pick-off)</td>
</tr>
<tr>
<td>16</td>
<td>– Common for input 2</td>
</tr>
<tr>
<td>17</td>
<td>+ 4/20mA</td>
</tr>
<tr>
<td>18</td>
<td>Common for links</td>
</tr>
<tr>
<td>19</td>
<td>Configure security link</td>
</tr>
<tr>
<td>20</td>
<td>Inhibit input link</td>
</tr>
<tr>
<td>S1</td>
<td>Start</td>
</tr>
<tr>
<td>S2</td>
<td>Stop</td>
</tr>
<tr>
<td>S3</td>
<td>Reset</td>
</tr>
<tr>
<td>S4</td>
<td>Menu</td>
</tr>
<tr>
<td>S5</td>
<td>Do not use</td>
</tr>
<tr>
<td>S6</td>
<td>Do not use</td>
</tr>
<tr>
<td>S7</td>
<td>Common for switches</td>
</tr>
</tbody>
</table>

**TERMINAL CONNECTIONS**

**BA458C & BA658C**

- **Case**:
  - For earthing the enclosure

- **Terminal Connections**:
  - **Control 1**: +, A1
  - **Output 2**: –, A2
  - **Output 3**: +, A3
  - **Output 4**: –, A4
  - **Output 5**: +, A5
  - **Output 6**: –, A6

- **Note**: BA658C: Control 1, Output 2 and Output 3 are relay contacts which are not polarised.

- **Display**:
  - BA458C

- **Recommended Panel Cut-out**:
  - DIN 43 700
  - 136.0 ± 0.5/0.0 x 66.2 ± 0.5/0.0 mm

- **Recommended Panel Cut-out Dimensions**:
  - 144 x 72 mm

- **Recommended Panel Cut-out Dimensions**:
  - 138.0 ± 0.5/0.0 x 66.2 ± 0.5/0.0 mm

- **Panel Cut-out**:
  - 136.0 ± 0.5/0.0 x 66.2 ± 0.5/0.0 mm

- **Optional Outputs**:
  - Outputs 4, 5, and 6 may each be configured to have one of six functions.

- **Panel Mounting Clips**:
  - Four panel mounting clips must be used.
These loop powered temperature transmitters incorporate a large easy to read digital display providing accurate local temperature indication in addition to the analogue 4/20mA output current.

Each of the five instruments can be easily conditioned to work with any common resistance thermometer, thermocouple or with a voltage input. Optional alarm outputs enable under and over temperature warnings to be generated and an optional display backlight will enhance display contrast.

Both the intrinsically safe and Type nL models have ATEX certification allowing installation throughout Europe.

All transmitters are calibrated to customers’ requirements free of charge and can be labeled to show units of measurement, tag number and application.

Application guide AG370 describing the use of these indicating temperature transmitters is available from the BEKA website www.beka.co.uk or from our sales office.

To select the model for your application, please refer to the summary on the following page.
Select an Indicating Temperature Transmitter for your application from:

### Intrinsically safe models

<table>
<thead>
<tr>
<th>Model</th>
<th>BA374C</th>
<th>BA378C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page no.</td>
<td>151</td>
<td>155</td>
</tr>
<tr>
<td>Mounting</td>
<td>Field</td>
<td>Panel</td>
</tr>
<tr>
<td>Protection</td>
<td>IP66</td>
<td>Front IP65</td>
</tr>
<tr>
<td>Certification</td>
<td>ATEX Group II, Category 1G</td>
<td>EEx ia IIC T5</td>
</tr>
<tr>
<td>Display height</td>
<td>20mm</td>
<td>20mm</td>
</tr>
<tr>
<td>Options</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarms</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Backlight</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Type nL model

<table>
<thead>
<tr>
<th>Model</th>
<th>BA374NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page no.</td>
<td>153</td>
</tr>
<tr>
<td>Mounting</td>
<td>Field</td>
</tr>
<tr>
<td>Protection</td>
<td>IP66</td>
</tr>
<tr>
<td>Certification</td>
<td>ATEX Group II, Category 3G</td>
</tr>
<tr>
<td>Display height</td>
<td>20mm</td>
</tr>
<tr>
<td>Options</td>
<td></td>
</tr>
<tr>
<td>Alarms</td>
<td>Yes</td>
</tr>
<tr>
<td>Backlight</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### General purpose models

<table>
<thead>
<tr>
<th>Model</th>
<th>BA574C</th>
<th>BA578C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page no.</td>
<td>157</td>
<td>159</td>
</tr>
<tr>
<td>Mounting</td>
<td>Field</td>
<td>Panel</td>
</tr>
<tr>
<td>Protection</td>
<td>IP66</td>
<td>Front IP65</td>
</tr>
<tr>
<td>Certification</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Display height</td>
<td>20mm</td>
<td>20mm</td>
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<tr>
<td>Options</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarms</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Backlight</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
The BA374C is an ATEX certified intrinsically safe field mounting indicating temperature transmitter which simplifies temperature measurement and display in hazardous areas. It provides an accurate local digital temperature display from most common thermocouples or resistance thermometers, plus a 4/20mA analogue output current which may be scaled to represent any temperature range. The transmitter incorporates a 20mm high easy to read liquid crystal display and may be supplied with an optional LED backlight. Two adjustable alarms can also be fitted to provide over and under temperature warnings.

Main application of the BA374C is to display temperature in a hazardous process area and to transmit a 4/20mA current to the safe area. Units of display may be °C or °F and the linearised 4/20mA output can be scaled to represent any temperature range. The transmitter may be programmed on-site to operate with most common thermocouples and resistance thermometers, and includes facilities for differential temperature measurement. Millivoltage outputs from pressure, weighing and position transducers can also be displayed in engineering units and transmitted as a 4/20mA current.

Calibration and programming is performed via four sealed push-buttons located behind the instrument front cover where they are protected from damage and tampering. The programming functions are contained in easy to understand menus which are protected by a four digit user definable security code. All the instrument functions are programmable; including type of input, display units, and the range of the 4/20mA output. Calibration may be performed using the internal references, an external temperature calibrator or a voltage or resistive source. Loss of power does not affect calibration, as all settings are retained for at least five years after the instrument is switched off or disconnected.

ATEX intrinsic safety certification allows installation in all gas hazardous areas. The transmitter may be powered from a wide range of Zener barriers or galvanic isolators and internal isolation allows earthed, or floating, thermocouples and resistance thermometers to be directly connected to the BA374C in the hazardous area.

Display backlighting is available as an option to improve readability when the BA374C is installed in a poorly illuminated area. High efficiency LEDs provide an even glow to enhance the display contrast.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed as high or low trips. Each can control a certified hazardous area load or the output may be transferred to the safe area via a Zener barrier or galvanic isolator.

Two types of enclosure are available, each has stainless steel fittings and a toughened glass window and is sealed with a neoprene gasket. The sturdy glass reinforced polyester (GRP) enclosure is suitable for most industrial applications including off-shore and water treatment. For installation where solvents may be encountered, the epoxy painted aluminium enclosure provides maximum protection. Both the GRP and aluminium enclosures, which have been tested by ERA, provide IP66 protection as specified in BS5490. To simplify installation and maintenance, the transmitter assembly can be removed from the enclosure without disconnecting the field wiring.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The BA374C is protected from reverse connection and overrange inputs, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.

Complementary transmitters for use in Zone 2 and safe areas are available, see BA374NC and BA574C datasheets respectively.
## SPECIFICATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply</strong></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>10 to 30V</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td>3.8 to 22mA</td>
</tr>
<tr>
<td>Resolution</td>
<td>1µA</td>
</tr>
<tr>
<td>Resistance</td>
<td>5MΩ minimum</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Liquid crystal 20mm high</td>
</tr>
<tr>
<td>Reading rate</td>
<td>2 per second</td>
</tr>
<tr>
<td>Overrange</td>
<td>4 least significant digits are blanked</td>
</tr>
<tr>
<td><strong>Input</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td></td>
</tr>
<tr>
<td>Thermocouple</td>
<td>E: -205.0 to 1000.0, J: -210.0 to 1200.0, K: -205.0 to 1372.0, N: 0.0 to 1300.0, R: 0.0 to 1767.0, T: -200.0 to 400.0, Pallaplat: -100.0 to 490.0</td>
</tr>
<tr>
<td>Resistance thermometer</td>
<td>Pt100 BS EN60751:1996</td>
</tr>
<tr>
<td>Excitation current</td>
<td>175µA</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1°C</td>
</tr>
<tr>
<td>Voltage range</td>
<td>±75mV</td>
</tr>
<tr>
<td>Resolution</td>
<td>2.38µV</td>
</tr>
<tr>
<td>Isolation</td>
<td>250V rms between input and output</td>
</tr>
<tr>
<td><strong>Performance</strong></td>
<td></td>
</tr>
<tr>
<td>Effect of temperature on display</td>
<td>Voltage input: Zero drift: 1µV/°C, Span drift: &lt;30ppm/°C</td>
</tr>
<tr>
<td></td>
<td>THC input: Zero drift: 1µV/°C, Span drift: &lt;30ppm/°C</td>
</tr>
<tr>
<td></td>
<td>RTD input: Zero drift: 0.02°C/°C, Span drift: &lt;80ppm/°C</td>
</tr>
<tr>
<td>Linearity</td>
<td>&lt;0.1% error for all types of input</td>
</tr>
<tr>
<td>Series mode</td>
<td>&lt;0.1% error for 150V rms 50</td>
</tr>
<tr>
<td>Ac rejection</td>
<td>or 60Hz</td>
</tr>
<tr>
<td>Common mode</td>
<td>&lt;0.1% error for 250V rms 50</td>
</tr>
<tr>
<td>Ac rejection</td>
<td>or 60Hz</td>
</tr>
<tr>
<td><strong>Intrinsic safety</strong></td>
<td></td>
</tr>
<tr>
<td>Europe ATEX</td>
<td>EN50020:1994</td>
</tr>
<tr>
<td>Code</td>
<td>Group II, Category 1G</td>
</tr>
<tr>
<td>Cert No</td>
<td>EEx ia IIC T5</td>
</tr>
<tr>
<td>Location</td>
<td>BAS02ATEX118SX</td>
</tr>
<tr>
<td></td>
<td>BAS Ex96D2505 System</td>
</tr>
<tr>
<td></td>
<td>BAS Ex96D2506 System</td>
</tr>
<tr>
<td></td>
<td>Zone 0, 1 or 2</td>
</tr>
<tr>
<td>Installation</td>
<td>The BA374C may be powered from any certified Zener barrier or galvanic isolator whose output parameters do not exceed:</td>
</tr>
<tr>
<td></td>
<td>Uo: 30V dc</td>
</tr>
<tr>
<td></td>
<td>Io: 280mA dc</td>
</tr>
<tr>
<td></td>
<td>Po: 0.85W</td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
<td></td>
</tr>
<tr>
<td>Operating temp</td>
<td>-20 to +60°C (Certified for use at -40°C)</td>
</tr>
<tr>
<td>Storage temp</td>
<td>-40 to +85°C</td>
</tr>
<tr>
<td>Humidity</td>
<td>To 95% at 40°C</td>
</tr>
<tr>
<td>Enclosure</td>
<td>IP66 see ERA test report 5046/228</td>
</tr>
<tr>
<td>EMC</td>
<td>In accordance with EU Directive 89/336/EEC, full report available.</td>
</tr>
<tr>
<td><strong>Mechanical</strong></td>
<td></td>
</tr>
<tr>
<td>Terminals</td>
<td>Screw clamp for 0.5 to 2.5mm² cables</td>
</tr>
<tr>
<td>Weight</td>
<td>GRP enclosure: 1kg</td>
</tr>
<tr>
<td></td>
<td>Aluminium enclosure: 1.4kg</td>
</tr>
</tbody>
</table>

### TERMINAL CONNECTIONS

#### How to Order

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model number</strong></td>
<td>BA374C</td>
</tr>
<tr>
<td><strong>Enclosure</strong></td>
<td>GRP or aluminium</td>
</tr>
<tr>
<td><strong>Input</strong></td>
<td>THC &amp; type, RTD &amp; type or voltage*</td>
</tr>
<tr>
<td><strong>CJ compensation</strong></td>
<td>On or Off</td>
</tr>
<tr>
<td><strong>Broken THC drive</strong></td>
<td>Up, Down or Off</td>
</tr>
<tr>
<td><strong>Input voltage range</strong></td>
<td>mV/zero and span and corresponding displays</td>
</tr>
<tr>
<td><strong>Display units</strong></td>
<td>°C or °F</td>
</tr>
<tr>
<td><strong>Display resolution</strong></td>
<td>High or low</td>
</tr>
<tr>
<td><strong>Display at which output is:</strong></td>
<td>4mA XXXX*</td>
</tr>
<tr>
<td><strong>Alarm</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Accessory</strong></td>
<td>Please specify</td>
</tr>
</tbody>
</table>

### Accessories

- **Accessories**
  - LED backlight powered from 28V 3000Ω
  - Zener barrier or galvanic isolator.
  - Two independent single pole alarms each of which may be programmed as a high or low trip with a NC or NO output.
  - Engraved scale plate
  - Removable stainless steel plate fitted to each indicator, can be supplied engraved with units of measurement.
  - Engraved tag plate
  - Removable stainless steel plate fitted to each indicator, can be supplied engraved with tagging information.
  - **Pipe mounting**
  - 2 kits are available, BA392C and BA393.
  - BA394 mounts BA374C into a panel aperture.

*See accessory datasheet for details

### How to Order

- **Model number**: BA374C
- **Enclosure**: GRP or aluminium
- **Input**: THC & type, RTD & type or voltage*
- **CJ compensation**: On or OFF
- **Broken THC drive**: Up, Down or Off
- **Input voltage range**: mV/zero and span and corresponding displays
- **Display units**: °C or °F
- **Display resolution**: High or low
- **Display at which output is**: 4mA XXXX*
- **20mA XXXX**

Accessories

- **Display backlight**: Separately powered backlight
- **Alarms**: Separately powered backlight
- **Legend**: BA392C or BA393
- **Panel mounting kit**: BA394

*If calibration information is not supplied, will be set for 3 wire RTD input with 4 to 20mA output corresponding to a display of 0.0 to 100.0°C.

#Contact BEKA if calibration of accessories is required.
The BA374NC is a Type n field mounting indicating temperature transmitter which simplifies temperature measurement and display in Zone 2 hazardous areas. It provides an accurate local digital temperature display from most common thermocouples or resistance thermometers, plus a 4/20mA analogue output current which may be scaled to represent any temperature range. The transmitter incorporates a 20mm high easy to read liquid crystal display and may be supplied with an optional LED backlight. Two adjustable alarms can also be fitted to provide over and under temperature warnings.

Main application of the BA374NC is to display temperature in a Zone 2 hazardous process area, and to transmit a 4/20mA current to the safe area. Units of display may be °C or °F, and the linearised 4/20mA output can be scaled to represent any temperature range. The transmitter may be programmed on-site to operate with most common thermocouples and resistance thermometers, and includes facilities for differential temperature measurement. Millivoltage outputs from pressure, weighing and position transducers can also be displayed in engineering units and transmitted as a 4/20mA current.

Calibration and programming is performed via four sealed push-buttons located behind the instrument front cover where they are protected from damage and tampering. The programming functions are contained in easy to understand menus which are protected by a four digit user definable security code. All the instrument functions are programmable; including type of input, display units, and the range of the 4/20mA output. Calibration may be performed using the internal references, an external temperature calibrator or a voltage or resistive source. Loss of power does not affect calibration, as all settings are retained for at least five years after the instrument is switched off or disconnected.

A Type nL Declaration of Conformity confirms that the BA374NC complies with the requirements for Group II Category 3G equipment defined in the ATEX Directive 94/9/EC. It is based on BASEEFA certification to BS6941 and allows the BA374NC transmitter to be installed in Zone 2 hazardous areas without Zener barriers or galvanic isolators. For Zone 2 installations this provides a significantly less expensive alternative to intrinsically safe or flameproof instrumentation.

Display backlighting is available as an option to improve readability when the BA374NC is installed in a poorly illuminated area. High efficiency LEDs provide an even glow to enhance the display contrast.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed as high or low trips. Each can control a Type n hazardous area load, or the outputs may be transferred to the safe area, again without the need for Zener barriers or galvanic isolators.

Two types of enclosure are available, each has stainless steel fittings and a toughened glass window and is sealed with a neoprene gasket. The sturdy glass reinforced polyester (GRP) enclosure is suitable for most industrial applications including off-shore and water treatment. For installation where solvents may be encountered, the epoxy painted aluminium enclosure provides maximum protection. Both the GRP and aluminium enclosures, which have been tested by ERA, provide IP66 protection as specified in BS5490. To simplify installation and maintenance, the transmitter assembly can be removed from the enclosure without disconnecting the field wiring.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The BA374NC is protected from reverse connection and overrange inputs, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.

Complementary transmitters for use in all Zones and safe areas are available, see BA374C, and BA574C datasheets respectively.
**SPECIFICATION**

**Supply**
- Voltage: 10 to 30V

**Output**
- Current: 3.8 to 22mA
- Resolution: 1µA
- Resistance: 5MΩ minimum

**Display**
- Type: Liquid crystal 20mm high
- Reading rate: 2 per second
- Overrange: 4 least significant digits are blanked

**Input**
- Type: Thermocouple
- Display range: °C
- Display resolution: °C
- Excitation current: 175µA
- Resolution: 2.38µV
- Voltage range: ±75mV
- Voltage input: THC input
- RTD input
- Linearity: <0.1% error for all types of input
- Series mode: ac rejection
- Common mode: ac rejection
- Type: Pt100 BS EN60751:1996 three or four wire connection, or differential.
- E: -205.0 to 1000.0 0.1
- J: -210.0 to 1200.0 0.2
- K: -205.0 to 1372.0 0.2
- N: 0.0 to 1300.0 0.1
- R: 0.0 to 1767.0 0.5
- T: -200.0 to 400.0 0.1
- Pallaplat: -100.0 to 490.0 0.2
- Cold junction compensation: Selectable ON or OFF

**Resistance thermometer**
- Type: P100 BS EN60751:1996 three or four wire connection, or differential.
- Excitation current: 175µA
- Resolution: 0.1°C

**Performance**
- Effect of temperature on display
- Voltage input
- THC input
- RTD input
- Zero drift: 1µV/°C
- Span drift: 0.02°C/°C 20ppm/°C
- Effect of temperature on output (in addition to above)
- Voltage input
- THC input
- RTD input
- Zero drift: <30ppm/°C
- Span drift: <80ppm/°C
- Linearity: <0.1% error for 150V rms 50 Hz
- Common mode: <0.1% error for 250V rms 50 Hz

**Type N certification**
- ATEx
- EC Declaration of Conformity
- Standard: BS EN 50021:1999
- Code: Group II, Category 3G
- Location: Zone 2
- Cert. No.: N0014

**Environmental**
- Operating temp: -20 to +60°C (Certified for use at -40°C)
- Storage temp: -40 to +85°C
- Humidity: To 95% at 40°C

**Mechanical**
- Terminals: Screw clamp for 0.5 to 2.5mm² cables
- Weight: GRP enclosure 1kg
- Accessories: Aluminum enclosure 1.4kg

**Accessories**
- Separately powered backlight
- Backlight:
  - LED backlight powered from 18 to 30V dc supply.
- Alarms:
  - Two independent alarms each of which may be programmed as a high or low trip with a NC or NO output.

**Outputs**
- Isolated solid state switch
- Ron: Less than 5Ω + 0.6V
- Roff: Greater than 180kΩ

**Terminal Connections**
- Case: Input 4/20mA
- Alarm 1: Voltage input
- Alarm 2: Voltage input
- Engraved scale plate: Removable blank stainless steel plate fitted to each indicator, can be supplied engraved with units of measurement.*
- Engraved tag plate: Removable blank stainless steel plate fitted to each indicator, can be supplied engraved with tagging information.*
- Pipe mounting: 2 kits are available, BA392C and BA393.*
- Panel mounting kit: BA394 mounts BA374NC into a panel aperture.*

**How to Order**
- Please specify:
  - Model number: BA374NC
  - Enclosure: GRP or aluminum
  - CJ compensation: THC & type, RTD & type or voltage*
  - Broken THC drive: On or Off
  - Input voltage range: mV/zero and span and corresponding displays.
  - Display units:
    - °C or °F
  - Display resolution:
    - High or low
    - For THD & RTD inputs
  - Display at which output is:
    - 4mA XXXX*
    - 20mA XXXX*

**Accessories**
- Please specify if required:
  - Display backlight: Separately powered backlight
  - Alarms:
    - Alarms#
  - Scale plate: Legend
  - Tag plate: BA392C or BA393
  - Pipe mounting kit: BA394

*If calibration information is not supplied, will be set for 3 wire RTD input with 4 to 20mA output corresponding to a display of 0.0 to 100.0°C.
#Contact BEKA if calibration of accessories is required.
The BA378C is an ATEX certified intrinsically safe panel mounting indicating temperature transmitter which simplifies temperature measurement and display in hazardous areas. It provides an accurate local digital temperature display from most common thermocouples or resistance thermo-meters, plus a 4/20mA analogue output current which may be scaled to represent any temperature range. The transmitter incorporates a 20mm high easy to read liquid crystal display and may be supplied with an optional LED backlight. Two adjustable alarms can also be fitted to provide over and under temperature warnings.

Main application of the BA378C is to display temperature in a hazardous process area and to transmit a 4/20mA current to the safe area. Units of display may be °C or °F and the linearised 4/20mA output can be scaled to represent any temperature range. The transmitter may be programmed on-site to operate with most common thermocouples and resistance thermometers, and includes facilities for differential temperature measurement. Millivoltage outputs from pressure, weighing and position transducers can also be displayed in engineering units and transmitted as a 4/20mA current.

Calibration and programming is performed via the four front panel push-buttons which ‘click’ when operated. The programming functions are contained in easy to understand menus which are protected by a four digit user definable security code. All the instrument functions are programmable; including type of input, display units, and the range of the 4/20mA output. Calibration may be performed using the internal references, an external temperature calibrator or a voltage or resistive source. Loss of power does not affect calibration, as all settings are retained for at least five years after the instrument is switched off or disconnected.

ATEX intrinsic safety certification allows installation in all gas hazardous areas. The transmitter may be powered from a wide range of Zener barriers or galvanic isolators and internal isolation allows earthed, or floating, thermocouples and resistance thermometers to be directly connected to the BA378C in the hazardous area.

Display backlighting is available as an option to improve readability when the BA378C is installed in a poorly illuminated area. High efficiency LEDs provide an even glow to enhance the display contrast.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed as high or low trips. Each can control a certified hazardous area load or the output may be transferred to the safe area via a Zener barrier or galvanic isolator.

The front panel is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. A captive neoprene gasket provides an IP65 seal between the enclosure and the panel.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The BA378C is protected from reverse connection and overrange inputs, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.

Complementary transmitters for field mounting and use in safe areas are available, see BA374C, and BA578C datasheets respectively.
**SPECIFICATION**

**Supply**
- Voltage: 10 to 30V

**Output**
- Current: 3.8 to 22mA
- Resolution: 1µA
- Resistance: 5MΩ minimum

**Display**
- Type: Liquid crystal 20mm high
- Reading rate: 2 per second
- Overrange: 4 least significant digits are blanked

**Input**
- Type
  - Thermocouple
    - E: -205.0 to 1000.0°C, 0.1°C
    - J: -210.0 to 1200.0°C, 0.2°C
    - K: -205.0 to 1372.0°C, 0.2°C
    - N: 0.0 to 1300.0°C, 0.1°C
    - R: 0.0 to 1767.0°C, 0.5°C
    - T: -200.0 to 400.0°C, 0.1°C
    - Palliplat: -100.0 to 490.0°C, 0.2°C
  - Resistance thermometer
    - Type: Pt100 BS EN60751:1996 three or four wire connection, or differential.
    - Excitation current: 175µA
  - Voltage
    - Range: ±75mV
    - Resolution: 2.38µV
- Cold junction compensation.
- Broken THC
  - Selectable ON or OFF detection.

**Resistance thermometer**
- Type: Pt100 BS EN60751:1996 three or four wire connection, or differential.
- Excitation current: 175µA
- Resolution: 0.1°C

**Performance**
- Effect of temperature on display
  - Voltage input
    - Zero drift: 1µV/°C
    - Span drift: <30ppm/°C
  - THC input
    - Zero drift: 1µV/°C + 0.02°C/°C
    - Span drift: <30ppm/°C + <80ppm/°C
  - RTD input
    - Zero drift: 20ppm/°C
    - Span drift: 50ppm/°C
- Linearity
  - <0.1% error for all types of input
- Series mode
  - ac rejection: <0.1% error for 150mV rms 50Hz
- Common mode
  - ac rejection: <0.1% error for 250V rms 50Hz
- Intrinsic safety
  - Europe ATEX
    - Standard: EN50020:1994
    - Code: Group II, Category 1G
    - Cert No: Ex ia IIC T5
    - BASG2AEX1185X
    - BAS Ex6D2505 System
    - BAS Ex6D2506 System
    - Location: Zone 0, 1 or 2
- Installation
  - The BA378C may be powered from any certified Zener barrier or galvanic isolator whose output parameters do not exceed:
    - Uo: 30V dc
    - Io: 280mA dc
    - Po: 0.85W
- Environmental
  - Operating temp: -20 to +60°C (Certified for use at -40°C)
  - Storage temp: -40 to +85°C
  - Humidity: To 95% at 40°C non-condensing
  - Enclosure: Front IP65 rear IP20
- Mechanical
  - Terminals: Blue screw clamp for 0.5 to 1.5mm² cables
  - Weight: 0.5kg
- Accessories
  - Separately powered backlight
  - LED backlight powered from 28V 300Ω Zener barrier or galvanic isolator.

**DIMENSIONS (mm)**

**TERMINAL CONNECTIONS**

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

**Please specify**
- Model number: BA378C
- CJ compensation
  - On or OFF
  - Broken THC drive
  - mV zero and span
  - Input voltage range
  - mV zero and span and corresponding displays.
  - Display units
    - °C or °F
  - Display resolution
    - High or low
  - Display at which output is:
    - 4mA
    - 20mA
- Alarms
  - Two independent alarms each of which may be programmed as a high or low trip with a NC or NO output.
- Typeset scale card
  - Blank scale card fitted to each instrument can be supplied typeset with units of measurement.
- Tag number
  - Thermally printed number on rear of the instrument.
  - *See accessory datasheet for details

*If calibration information is not supplied, will be set for 3 wire RTD input with 4 to 20mA output corresponding to a display of 0.0 to 100.0°C.
#Contact BEKA if calibration of accessories is required.
The BA574C is a totally new field mounting indicating temperature transmitter which simplifies temperature measurement and display in process areas. It provides an accurate local digital temperature display from most common thermocouples or resistance thermometers, plus a 4/20mA analogue output current which may be scaled to represent any temperature range. The transmitter incorporates a 20mm high easy to read liquid crystal display and may be supplied with an optional LED backlight. Two adjustable alarms can also be fitted to provide over and under temperature warnings.

Main application of the BA574C is to display temperature in a process area, and to transmit a 4/20mA current to other instruments. Units of display may be °C or °F, and the linearised 4/20mA output can be scaled to represent any temperature range. The transmitter may be programmed on-site to operate with most common thermocouples and resistance thermometers, and includes facilities for differential temperature measurement. Millivoltage outputs from pressure, weighing and position transducers can also be displayed in engineering units and transmitted as a 4/20mA current.

Calibration and programming is performed via four sealed push-buttons located behind the instrument front cover where they are protected from damage and tampering. The programming functions are contained in easy to understand menus which are protected by a four digit user definable security code. All the instrument functions are programmable; including type of input, display units, and the range of the 4/20mA output. Calibration may be performed using the internal references, an external temperature calibrator or a voltage or resistive source. Loss of power does not affect calibration, as all settings are retained for at least five years after the instrument is switched off or disconnected.

Display backlighting is available as an option to improve readability when the BA574C is installed in a poorly illuminated area. High efficiency LEDs provide an even glow to enhance the display contrast.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed as high or low trips. Each alarm can switch a 30V, 100mA dc load.

Two types of enclosure are available, each has stainless steel fittings and a toughened glass window and is sealed with a neoprene gasket. The sturdy glass reinforced polyester (GRP) enclosure is suitable for most industrial applications including off-shore and water treatment. For installation where solvents may be encountered, the epoxy painted aluminium enclosure provides maximum protection. Both the GRP and aluminium enclosures, which have been tested by ERA, provide IP66 protection as specified in BS5490. To simplify installation and maintenance, the transmitter assembly can be removed from the enclosure without disconnecting the field wiring.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The BA574C is protected from reverse connection and overrange inputs, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.

Complementary transmitters for use in hazardous areas are available, see BA374C and BA374NC datasheets.
Indicating temperature transmitters

Supply
Voltage 10 to 30V

Output
Current 3.8 to 22mA
Resolution 1µA
Resistance 5M ohm minimum

Display
Type Liquid crystal 20mm high
Reading rate 2 per second
Overrange 4 least significant digits are blanked

Input
Type Thermocouple E -205.0 to 1000.0 0.1
J -210.0 to 1200.0 0.2
K -205.0 to 1372.0 0.2
N 0.0 to 1300.0 0.1
R 0.0 to 1767.0 0.5
T -200.0 to 400.0 0.1
Pallaplat -100.0 to 490.0 0.2
Cold junction compensation. Selectable ON or OFF
Broken THC drive Selectable UP, DOWN or OFF detection.

Resistance thermometer
Type Pt100 BS EN60751:1996 three or four wire connection, or differential.
Excitation current 175µA
Resolution 0.1˚C

Voltage
Range ±75mV
Resolution 2.38µV

Isolation 250V rms between input and output

Performance
Effect of temperature on display Voltage input THC input RTD input
Zero drift 1µV/˚C 1µV/˚C + 0.02˚C/˚C 20ppm/˚C
Span drift <30ppm/˚C <30ppm/˚C <80ppm/˚C

Effect of temperature on 4/20mA output (in addition to above)
Zero drift 20ppm/˚C
Span drift 50ppm/˚C

Linearity <0.1% error for all types of input
Series mode <0.1% error for 150mV rms 50
ac rejection or 60Hz
Common mode <0.1% error for 250V rms 50 or
ac rejection 60Hz

Environmental
Operating temp -20 to +60˚C (Certified for use at -40˚C)
Storage temp -40 to +85˚C
Humidity To 95% at 40˚C
Enclosure IP66 see ERA test report 5046/228
EMC In accordance with EU Directive 89/336/EEC, full report available.

Mechanical
Terminals Screw clamp for 0.5 to 2.5mm² cables
WeightGRP enclosure 1kg
Aluminium enclosure 1.4kg

Accessories
Separately powered backlight
LED backlight powered from 18 to 30V dc supply.
Alarms Two independent alarms each of which may be programmed as a high or low trip with a NC or NO output.
Outputs Isolated solid state switch
Ron Less than 5Ω + 0.6V
Roff Greater than 180k
Vmax 30Vdc
I\text{max} 100mA

Engraved scale plate Removable blank stainless steel plate fitted to each indicator, can be supplied engraved with units of measurement.*
Engraved tag plate Removable blank stainless steel plate fitted to each indicator, can be supplied engraved with tagging information.*
Pipe mounting kit 2 kits are available, BA392C and BA393 *
Panel mounting kit BA394 mounts BA574C into a panel aperture.*

*See accessory datasheet for details

DIMENSIONS (mm)

SPECIFICATION

TERMINAL CONNECTIONS

HOW TO ORDER

Please specify
Model number BA574C
Enclosure GRP or aluminium
CJ compensation THC & type, RTD & type or voltage*
Input On or OFF
Broken THC drive Up, Down or Off
Input voltage range mV zero and span
Display units °C or °F
Display resolution High or low
Display at which output is: 4mA XXX*
20mA XXX*

Accessories Separately powered backlight
Display backlight
Alarms Alarms*
Scale plate Legend
Tag plate Legend
Pipe mounting kit BA392C or BA393
Panel mounting kit BA394

*If calibration information is not supplied, will be set for 3 wire RTD input with 4 to 20mA output corresponding to a display of 0.0 to 100.0˚C.
#Contact BEKA if calibration of accessories is required.
The BA578C is a totally new panel mounting indicating temperature transmitter which simplifies temperature measurement and display in process areas. It provides an accurate local digital temperature display from most common thermocouples or resistance thermometers, plus a 4/20mA analogue output current which can be scaled to represent any temperature range. The transmitter incorporates a 20mm high easy to read liquid crystal display and may be supplied with an optional LED backlight. Two adjustable alarms can also be fitted to provide over and under temperature warnings.

Main application of the BA578C is to display temperature in a process area, and to transmit a 4/20mA current to other instruments. Units of display may be °C or °F, and the linearised 4/20mA output can be scaled to represent any temperature range. The transmitter may be programmed on-site to operate with most common thermocouples and resistance thermometers, and includes facilities for differential temperature measurement. Millivoltage outputs from pressure, weighing and position transducers can also be displayed in engineering units and transmitted as a 4/20mA current.

Calibration and programming is performed via the four front panel push-button which ‘click’ when operated. The programming functions are contained in easy to understand menus which are protected by a four digit user definable security code. All the instrument functions are programmable; including type of input, display units, and the range of the 4/20mA output. Calibration may be performed using the internal references, an external temperature calibrator or a voltage or resistive source. Loss of power does not affect calibration, as all settings are retained for at least five years after the instrument is switched off or disconnected.

Display backlighting is available as an option to improve readability when the BA578C is installed in a poorly illuminated area. High efficiency LEDs provide an even glow to enhance the display contrast.

Optional alarms provide two galvanically isolated solid state outputs which may be independently programmed as high or low trips. Each alarm can switch a 30V, 100mA dc load.

The front panel is a robust, easy to clean Noryl moulding sealed with a non-reflective, scratch resistant polyester membrane. A captive neoprene gasket provides an IP65 seal between the enclosure and the panel.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The BA578C is protected from reverse connection and overrange inputs, and incorporates extensive radio frequency filtering to comply with the European EMC Directive.

Complementary transmitters for field mounting and use in hazardous areas are available, see BA574C, and BA378C datasheets respectively.
**SPECIFICATION**

**Supply**
- Voltage: 10 to 30V

**Output**
- Current: 3.8 to 22mA
- Resolution: 1µA
- Resistance: 5M ohm minimum

**Display**
- Type: Liquid crystal 20mm high
- Reading rate: 2 per second
- Overrange: 4 least significant digits are blanked

**Input**
- Type: Thermocouple
- Display range: °C
- Display resolution: °C
  - E: -205.0 to 1000.0
  - J: -210.0 to 1200.0
  - K: -205.0 to 1372.0
  - N: 0.0 to 1300.0
  - R: 0.0 to 1767.0
  - T: -200.0 to 400.0
  - Palliplat: -100.0 to 490.0

**Resistance thermometer**
- Type: Pt100 BS EN60751:1996 three or four wire connection, or differential
- Excitation current: 175µA
- Resolution: 0.1°C

**Voltage**
- Range: ±75mV
- Resolution: 2.38µV

**Isolation**
- 250V rms between input and output

**Performance**
- Effect of temperature on display:
  - Voltage input: 1µV/°C
  - THC input: 1µV/°C + 0.02°C/°C
  - RTD input: 20ppm/°C
- Span drift: <30ppm/°C + 0.02°C/°C + 20ppm/°C

- Effect of temperature on 4/20mA output:
  - (in addition to above)
  - Zero drift: 20ppm/°C
  - Span drift: 50ppm/°C
- Linearity: <0.1% error for all types of input
- Series mode: <0.1% error for 150mV rms 50 ac rejection or 60Hz
- Common mode: <0.1% error for 250V rms 50 ac rejection

**Environmental**
- Operating temp: -20 to +60°C (Certified for use at -40°C)
- Storage temp: -40 to +85°C
- Humidity: To 95% at 40°C non-condensing
- Enclosure: Front IP65 rear IP20

**Mechanical**
- Terminals: Blue screw clamp for 0.5 to 1.5mm² cables
- Weight: 0.5kg

**Accessories**
- Separately powered backlight: LED backlight powered from 18 to 30V dc supply.
- Alarms: Two independent alarms each of which may be programmed as a high or low trip with a NC or NO output.
- Outputs:
  - Ron: Less than 5Ω + 0.6V
  - Roff: Greater than 180k
  - Vmax: 30Vdc
  - Imax: 100mA

**Typeset scale card**
- Blank scale card fitted to each instrument can be supplied typeset with units of measurement.

**Tag number**
- Thermally printed number on rear of the instruments.

**DIMENSIONS (mm)**

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

- Model number: BA578C
- Input:
  - CJ compensation
  - Broken THC drive
  - Input voltage range
- Display units
- Display resolution
- Display at which output is:
  - 4mA
  - 20mA

- Please specify:
  - Calibration of accessories is required.
  - For THC & RTD inputs

- Accessories:
  - Display backlight
  - Scale card
  - Tag number

- Please specify if required:
  - Separately powered backlight
  - Alarms

*If calibration information is not supplied, will be set for 3 wire RTD input with 4 to 20mA output corresponding to a display of 0.0 to 100.0°C.
#Contact BEKA if calibration of accessories is required.

*See accessory datasheet for details.
A comprehensive collection of sounders, flashing beacons and panels lamps mainly for use in hazardous area.

The recently introduced BR385 third generation intrinsically safe sounder can generate 49 different first stage tones and may be powered from the same barrier or isolator as a BA386 flashing beacon.

In addition to our industry standard BA390 intrinsically safe LED cluster lamps, the low current versions produce a useful light output with only 4mA input, allowing operation from remote I/O and digital output fieldbus modules.

Our well established EEx d certified sounders, beacons and combined sounder are now available for use with combustible dusts.

*To select the model for your application, please refer to the summary on the following page.*
Select a sounder, beacon or cluster lamp for your application from:

### Panel mounting Cluster Lamps

<table>
<thead>
<tr>
<th>Model</th>
<th>BA390</th>
<th>BA390S</th>
<th>BA590</th>
<th>BA591</th>
<th>BA592</th>
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<tr>
<td>Page no.</td>
<td>167</td>
<td>169</td>
<td>171</td>
<td>171</td>
<td>171</td>
</tr>
<tr>
<td>Terminal voltage</td>
<td>14V from IS source</td>
<td>8.7V from IS source</td>
<td>24V dc</td>
<td>115V ac</td>
<td>230V ac</td>
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<tr>
<td>Current</td>
<td>20mA</td>
<td>4mA</td>
<td>20mA</td>
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<tr>
<td>Colours</td>
<td>Red, amber, green, blue and white</td>
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<tr>
<td>Protection</td>
<td>Front IP65</td>
<td>Rear IP20</td>
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<tr>
<td>Certification</td>
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<td>General purpose</td>
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<td>Options</td>
<td>IP65 rear sealing assembly</td>
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<tr>
<td>Legend plate</td>
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### Intrinsically safe Sounders and Beacons

<table>
<thead>
<tr>
<th>Model</th>
<th>BR385 Sounder</th>
<th>BA386 Beacon</th>
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</thead>
<tbody>
<tr>
<td>Page no.</td>
<td>163</td>
<td>165</td>
</tr>
<tr>
<td>Terminal voltage</td>
<td>8V from IS source</td>
<td>10V dc from IS source</td>
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<tr>
<td>Current</td>
<td>25mA</td>
<td>25mA</td>
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<tr>
<td>Colours</td>
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<td>Red, amber, green, blue and white</td>
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<tr>
<td>Protection</td>
<td>IP66</td>
<td>IP56</td>
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<tr>
<td>Certification</td>
<td>EEx ia IIC T4</td>
<td>ATEX Group II, Category 1G FM IS ATEX Group II, Category 1G FM IS and Nonincendive</td>
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### Flameproof Sounders and Beacons

<table>
<thead>
<tr>
<th>Model</th>
<th>BExS110D Sounder</th>
<th>BExBG05D Beacon</th>
<th>BExCS110-05D* Sounder &amp; Beacon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page no.</td>
<td>173</td>
<td>175</td>
<td>176</td>
</tr>
<tr>
<td>Terminal voltage</td>
<td>12, 24, 48V dc 115, 230V ac</td>
<td>24V dc 115V, 230V ac</td>
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</tr>
<tr>
<td>Colours</td>
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<td>Red, amber, blue, green, yellow &amp; clear</td>
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<td>Protection</td>
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<tr>
<td>Certification #</td>
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<td>ATEX Group II, Category 2GD EEx d IIC TS T100°C</td>
<td>ATEX Group II, Category 2G EEx d IIB T4 or Group II, Category 2GD T100°C, EExd IIC T4</td>
</tr>
</tbody>
</table>

*NB Important note: BExCS110-05D is not for sale, resale, installation or use within the United States of America as a sole, multiple integrated or incorporated unit.

* See datasheets for details of dust certification.
The BR385 is a third generation intrinsically safe field mounting sounder which supersedes the BA385-IIC and BA385-IIB. The new sounder, which produces a loud audible warning signal in a hazardous area has forty nine different first stage alarm sounds selectable by internal switches. Each first stage tone can be changed to a second or a third stage alarm sound by an external contact which may be in the safe or hazardous area. Selectable outputs include DIN, NFS, PFEER, Australian and Singaporean defined warning, alert and evacuation tones.

Main application of the BR385 sounder is the generation of unique audible warnings within a hazardous area. The sounder may be powered from a wide range of Zener barriers or galvanic isolators and may be controlled by any contact or dc supply in the safe area. The BR385 may also be switched in the hazardous area by an intrinsically safe relay, or any equipment with an intrinsically safe, simple apparatus switch output, such as a BEKA Intrinsically safe loop powered indicator or a serial text display.

The selected first stage tone can be changed to a different second or third stage tone by inter-connecting sounder terminals using a switch contact, which may be in the safe or hazardous area. This enables one sounder to announce up to three different conditions, for example, alarms warning, alarm and automatic shut-down.

A crystal controlled oscillator accurately defines the frequency and repetition rate of each alarm signal. This ensures that when multiple BR385 sounders are activated at the same time the output tones from all the sounders remain synchronised.

ATEX and FM intrinsic safety certification permits installation in all gas hazardous zones and all gas groups. Input safety parameters allow use with a wide range of Zener barriers and galvanic isolators, and zero output parameters simplify intrinsic safety system design.

A BA386 LED flashing beacon may be powered from the same Zener barrier or galvanic isolator as the sounder. This significantly reduces installation costs of a combined sounder and beacon system and includes an alarm accept function, while only marginally reducing the sound output, but may only be used for ATEX systems. See the BA386 datasheet for full information.

The robust ABS enclosure which is flame-retardant provides IP66 protection and is suitable for external mounting. Cable entry is via a single untapped hole which will accept a 20mm gland or conduit fitting. A 20mm knock-out is also provided in the rear of the enclosure.

The BR385 contains overvoltage protection to prevent damage during commissioning and to allow the sounder to be tested in a safe area without the need for a Zener barrier or galvanic isolator.
**SPECIFICATION**

**Power supply**
- Voltage: 16V min via 28V 93mA Zener barrier
- 8 to 28V between – and + terminals.

**Current**
- 25mA typical when powered from 24Vdc via a 28V, 93mA Zener barrier.

**Second and third stage alarms**
- Second stage: Connect terminal S2 to ‘-’ terminal
- Third stage: Connect terminal S3 to ‘-’ terminal

**Intrinsic safety**
- **Europe ATEX**
  - Standard: EN50020:2002
  - Code: Group II Category 1G
  - Cert. No.: Sira06ATEX2032X
  - Installation: The BR385 may be powered from any ATEX certified Zener barrier or galvanic isolator whose output parameters do not exceed:
    - $U_o = 28$Vdc
    - $I_o = 93$mA
    - $P_o = 0.66$W
  - Location: Zone 0, 1 or 2

**Output**
- Sound level at 1m: Up to 103dB(A)
- Volume control: 15dB(A) level reduction

**USA FM**
- Standard: 3610 Entity
- Code: CLI, Div. 1, Gp A, B, C, and D
- Temperature code: T4 at 60°C
- File No.: 3027157

**TERMINALS AND CONTROLS**

**Tone Number**
- Tone 1: Continuous 340Hz
- Tone 2: Alternating 850/1000Hz @ 0.25s intervals
- Tone 3: Slow whoop 500/1200Hz @ 0.3Hz with 0.5s gap repeated
- Tone 4: Sweeping 500/1000Hz @ 1Hz
- Tone 5: Continuous 2400Hz
- Tone 6: Sweeping 2400/2900Hz @ 7Hz
- Tone 7: Sweeping 2400/2900Hz @ 2Hz
- Tone 8: Siren 500/1200/500Hz @ 0.3Hz
- Tone 9: Sweeping 1200/500Hz @ 1Hz – D.I.N.
- Tone 10: Alternating 2400/2900Hz @ 2Hz
- Tone 11: Intermittent 1000Hz @ 1Hz
- Tone 12: Alternating 800/1000Hz @ 0.875Hz
- Tone 13: Intermittent 2400Hz @ 1Hz
- Tone 14: Intermittent 800Hz 0.25s ON, 1s OFF
- Tone 15: Continuous 800Hz
- Tone 16: Intermittent 660Hz 150Hz ON, 150ms OFF
- Tone 17: Alternating 544Hz (100ms) / 440Hz (400ms) – NFS 32-001
- Tone 18: Intermittent 660Hz 1.8s ON, 1.8s OFF
- Tone 19: Sweeping 1400Hz to 1600Hz up 1s 1600Hz to 1400Hz down 0.5s
- Tone 20: Continuous 660Hz
- Tone 21: Alternating 554/440Hz @ 1Hz
- Tone 22: Intermittent 554Hz @ 0.875Hz
- Tone 23: Continuous 800Hz @ 2Hz
- Tone 24: Sweeping 800/1000Hz @ 50Hz
- Tone 25: Sweeping 2400/2900Hz @ 50Hz
- Tone 26: Simulated bell
- Tone 27: Continuous 554Hz
- Tone 28: Continuous 440Hz
- Tone 29: Sweeping 800/1000Hz @ 7Hz
- Tone 30: Continuous 300Hz
- Tone 31: Sweeping 660/1200 @ 1Hz
- Tone 32: Two Tone Chime
- Tone 33: Intermittent 745Hz
- Tone 34: Alternating 1000/2000Hz @ 0.5s – Singapore
- Tone 35: 420Hz @ 0.625s - Australian Alert
- Tone 36: 550-1200Hz 3.75s / 0.25s - Australian Evacuate
- Tone 37: Continuous 1000Hz
- Tone 38: Continuous 2000Hz
- Tone 39: Intermittent 800Hz 0.25s ON 1s OFF
- Tone 40: Alternating 544Hz (100ms) / 440Hz (400ms) – NFS 32-001
- Tone 41: Motor Siren – Slow rise to 1200Hz
- Tone 42: Motor Siren – Slow rise to 800Hz
- Tone 43: Continuous 1200Hz
- Tone 44: Motor Siren – Slow rise to 2400Hz
- Tone 45: Intermittent 1000Hz 1s ON, 1s OFF
- Tone 46: Sawtooth 1200/500Hz @ 1Hz – D.I.N. (PFEER P.T.A.P)
- Tone 47: Intermittent 1000Hz 1s ON, 1s OFF – PFEER General Alarm
- Tone 48: 420Hz @ 0.625s - Australian Alert
- Tone 49: 500-1200Hz 3.75s / 0.25s - Australian Evacuate

**HOW TO ORDER**
- Please specify Model number: BR385
- Accessories: Please specify if required
- Tag number: Thermally printed tag strip

**Environmental**
- Operating temp: -40 to +60°C
- Storage temp: -40 to +85°C
- Humidity: To 95% @ 40°C

**Enclosure**
- IP66

**EMC**
- In accordance with EU Directive 89/336/EEC

**Mechanical**
- Terminals: Screw clamp for 0.5 to 2.5 mm² cable.
- Weight: 1 kg

**Accessories**
- Tag number: Thermally printed tag strip

**TERMINALS AND CONTROLS**

**DIMENSIONS (mm)**

- Two 7mm dia. fixing holes
- 20mm dia. untapped hole for gland or conduit

**TERMINALS AND CONTROLS**

- Terminals
- Volume control
- Tone selection switches

**Environmental**

- Operating temp: -40 to +60°C
- Storage temp: -40 to +85°C
- Humidity: To 95% @ 40°C

**Enclosure**

- IP66

**EMC**

- In accordance with EU Directive 89/336/EEC

**Mechanical**

- Terminals: Screw clamp for 0.5 to 2.5 mm² cable.
- Weight: 1 kg

**Accessories**

- Tag number: Thermally printed tag strip
The BA386 is an intrinsically safe field mounting beacon which produces a bright flashing warning signal in a hazardous area. This beacon is significantly less expensive than the traditional Xenon devices, although it has a similar light output, flashes more frequently and is available in five different colours.

The beacon may be used alone, or in conjunction with a BEKA intrinsically safe sounder. The high efficiency of the BA386 enables the beacon and the sounder to be powered from a common Zener barrier or galvanic isolator. In combined systems this eliminates one barrier or isolator and associated wiring, thus simplifying the installation and further reducing cost.

Alarm accept is another unique feature of the BA386 which in combined systems enables the sounder to be silenced for a pre-set time leaving the beacon flashing twice per second. The alarm is accepted by momentarily closing a pair of external contacts, such as a push-button which may be located in the hazardous or the safe area. The sounder silence time may be pre-set for between 1 and 30 minutes.

Main application of the BA386 beacon is to provide a visible warning in a noisy hazardous process area where a sounder is not easily identified. The beacon may be powered from a wide variety of Zener barriers or galvanic isolators and may be controlled by any contact or dc supply in the safe area. It may also be switched in the hazardous area by an intrinsically safe relay or any equipment with an intrinsically safe output such as the alarm output of a BEKA indicator or totaliser.

When the BA386 beacon is used in conjunction with a BEKA intrinsically safe sounder it forms a combined audio visual alarm with integral sounder silence facilities. It is ideal where an operator needs to be advised that an alarm condition has occurred, but wishes to silence the intrusive audible warning. If the alarm condition is not corrected during the silence period, the sounder will be re-activated when the pre-set silence time has expired.

ATEX intrinsic safety certification permits installation in Zones 0, 1 or 2. The supply terminals comply with the requirements for simple apparatus allowing the beacon to be controlled by a wide variety of certified intrinsically safe circuits.

The flame retardant enclosure provides IP56 protection and is suitable for external mounting in sheltered locations. Cable entry is via 20mm untapped holes in the sides of the enclosure and there is a ‘knock-out’ in the rear for an additional entry.

When used with a BEKA BR385 sounder, the beacon may be mounted onto the base of the sounder to form a combined assembly, or may be mounted separately.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee. The BA386 is protected from input overloads and reverse connection and complies with the European EMC Directive.

---

**BA386 LED flashing beacon**

**Intrinsically safe for use in all hazardous gas areas**

- Intrinsically safe ATEX & FM certification
- Red, amber, green blue & white models
- Two double flashes per second
- Will power BEKA intrinsically safe sounder
- Incorporates alarm accept function to silence sounder for user adjustable time
- 3 year guarantee
Please specify Colour Model number
Red BA386R
Amber BA386A
Green BA386G
Blue BA386B
White BA386W

Accessories Please specify if required
Tag strip
Legend
Combining kit

*Supplied free of charge on request when sounder and beacon are purchased at the same time

**How to Order**

Colour
Red
Amber
Green
Blue
White

Accessories
Tag strip
Combining kit

**Specifcation**

**Power supply**
Voltage
10 to 28V
(across terminals 1 & 2)
Not damaged by temporary connection to the supply without a Zener barrier or galvanic isolator in circuit.

Current
When powered from 24V supply via
28V 53mA Zener barrier.

Alone
25mA typical

With BR385 sounder
40mA typical

**Output**
Brightness
Equivalent to 0.5 Joule xenon beacon

Frequency
 Alone
2Hz (2 double flashes per second)

With BR385 sounder
 on silenced
1Hz (1 double flash per second)
(alarm accepted)

Sounder output
Reduced by typically 2dB when used with beacon.

Response
On time
First flash within 2 seconds of supply being connected.

Off time
Last flash less than 5 seconds after supply is removed.

Repeat alarm
To guarantee alarm accept status, supply should not be reconnected within 5 seconds of disconnection.

**Intrinsic safety**
Europe ATEX
Standard
EN50020:1994
Code
Group II Category 1G

Cert. No.
IT502ATEX2006
Ex02E2007 IIC system
Ex02E2008 IIC system
Ex02E2011 IIB system
For use alone or with BA386 sounder

Installation
May be powered from any certified Zener barrier or galvanic isolator whose output parameters do not exceed:

Alone
Uo 28Vdc
Io 110mA
Po 0.8W

With BR385
28Vdc
93mA
0.66W

Location
Zone 0, 1 or 2

Accept input terminals 5 & 6
May be connected to any mechanically activated switch having IP20 protection which is capable of withstanding an ac test voltage of 500Vrms to earth for one minute

**USA FM**

Does not include use with BR385 sounder

Standard
3610 Entity
Code
Alone or with BA385-IIC sounder
CL.1, Div. 1, Gp. A, B, C and D

With BA385-IIB sounder
CL.1, Div. 1, Gp. C and D

Temperature code
T4 at 60˚C

File No
3014996

Standard
3611 Nonincendive.
Code
Alone or with BA385-IIC sounder
CL.1, Div. 2, Gp. A, B, C and D

With BA385-IIB sounder
CL.1, Div. 2, Gp. C and D

Temperature code
T4 at 60˚C

File No
3014996

Environmental
Operating temp
-20 to +60˚C (certified for use at -40˚C)

Storage temp
-40 to +85˚C

Humidity
To 95% @ 40˚C

Enclosure
IP56

Mechanical
Terminals
Removable with screw clamp for 0.5 to 1.5mm² cable.

Weight
0.4kg

Accessories
Tag strip
Thermally printed tag strip secured by screws.

Combining kit
Gasket and conduit fitting for mounting BA386 beacon onto bottom of BR385 sounder.
The BA390 cluster lamps provide reliable cost-effective visual status indication in all hazardous areas. Each BA390 contains a group of high efficiency light emitting diodes mounted behind a coloured diffuser to produce a bright, uniform output with a typical life greater than ten years. All models contain a 20mA current regulator which maintains constant brilliance and provides protection against excess voltages.

ATEX intrinsic safety certification allows BA390 LED cluster lamps to be installed in all gas hazardous areas. Two lamps may be powered from a single IIC intrinsically safe Zener barrier or galvanic isolator and up to four lamps from a IIB device. FM certification allows BA390 lamps to be installed in the USA.

Five well defined colours - red, amber, green, blue and white comply with the indicator light colour requirements specified in IEC204-1, allowing all plant conditions to be annunciated.

IP66 sealing of the lens and the joint between the lamp and the panel makes the BA390 ideal for installations in areas that will be hosed, washed or splashed. When environmental protection behind the panel is also required, an optional rear sealing assembly is available.

Mounting is via a single industry standard 22.5mm diameter hole. The lamp housing, fixing nut and terminals have a maximum diameter of 30mm which permits a very high packing density on the panel.

To aid identification from the rear of the panel, the model number and suffix which identifies the colour are marked on the lamp body close to the terminals.

The lamp function can be shown on an optional legend plate secured between the lamp and the panel. Plates can be supplied blank or typeset with up to two rows of ten alphanumeric characters.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee.

Low current Intrinsically safe cluster lamps for use with fieldbus multiple output modules or other low current sources are also available, please refer to the BA390S datasheet.

For safe area installations, please refer to the BA590 datasheet which describes a complementary range of non certified 24V dc and mains powered cluster lamps.
**SPECIFICATION**

**Power supply**
- Voltage:
  - Operating: 14 to 30V dc
  - Reverse: 60V max
- Current: 18 to 22mA

**Output**
- Lamp colour: Typical at 150mm
  - Red: 190 lux
  - Amber: 150 lux
  - Green: 250 lux
  - Blue: 150 lux
  - White: 300 lux

**Intrinsic Safety**
- Europe ATEX
  - Standard EN50020:1994
  - Code Group II Category 1G
  - Certificate numbers BAS01ATEX1062X, Ex93C2433 System IIC

**Installation**
- One or two BA390 lamps may be powered from any EEx ia IIC certified Zener barrier or galvanic isolator whose output safety parameters do not exceed:
  - $U_0$ 30V dc
  - $P_O$ 1.3W at 40˚C
  - $P_O$ 1.2W at 60˚C
  - (e.g. 28V, 300Ω or 28V, 234Ω Zener barrier or galvanic isolator)
  - Gas groups IIA, IIB or IIC
- Location Zone 0, 1 or 2

**USA FM**
- Standard 3610 Entity
- Code CL I: Div 1: GP A, B, C, & D: T4 @ 60˚C
- File 3022662

**Environmental**
- Operating temperature -20 to 60˚C
- Storage temperature -40 to 85˚C
- Relative humidity 5 to 95% non condensing
- Operating life 100,000 hours typical
- Enclosure Rear IP20 - see accessories for optional IP65 rear sealing assembly.

**Mechanical**
- Terminals Screw clamp for 1.5mm²
- Lens material Polycarbonate
- Body material Nylon 6
- Weight 18g

**Accessories**
- Legend plate Will accommodate up to two rows of ten alphanumeric characters

**DIMENSIONS (mm)**

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

<table>
<thead>
<tr>
<th>Lamp colour</th>
<th>Please specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>BA390R</td>
</tr>
<tr>
<td>Amber</td>
<td>BA390A</td>
</tr>
<tr>
<td>Green</td>
<td>BA390G</td>
</tr>
<tr>
<td>Blue</td>
<td>BA390B</td>
</tr>
<tr>
<td>White</td>
<td>BA390W</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Please specify if required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legend plate</td>
<td>BA390A</td>
</tr>
</tbody>
</table>

**Example**
- Model number & colour BA390A
- Legend plate START
BA390S low current cluster lamps provide reliable cost-effective visual status indication in all hazardous areas. Lamps have a typical life of ten years and, depending upon colour, contain two or three high efficiency light emitting diodes mounted behind a coloured diffuser to produce a uniform output.

Optimised for high brightness at low current BA390S lamps may be powered from almost any intrinsically safe output. Their high efficiency enables them to provide a useful output with an input current of only a few milliamps. For example, a BA390S lamp may be powered from one output of an intrinsically safe multiple digital output fieldbus module. These have several separate 4mA outputs, thus a number of BA390S cluster lamps may be powered and controlled by one module.

ATEX and FM intrinsic safety certification allows BA390S cluster lamps to be installed in all gas hazardous areas in both Europe and the USA.

Five well defined colours - red, amber, green, blue and white comply with the indicator light colour requirements specified in IEC204-1, allowing all plant conditions to be annunciated.

IP66 sealing of the lens and the joint between the lamp and the panel makes the BA390S ideal for installations in areas that will be hosed, washed or splashed. When environmental protection behind the panel is also required, an optional rear sealing assembly is available.

Mounting is via a single industry standard 22.5mm diameter hole. The lamp housing, fixing nut and terminals have a maximum diameter of 30mm which permits a very high packing density on the panel.

To aid identification from the rear of the panel, the model number and suffix which identifies the colour are marked on the lamp body close to the terminals.

The lamp function can be shown on an optional legend plate secured between the lamp and the panel. Plates can be supplied blank or typeset with up to two rows of ten alphanumerical characters.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee.

Intrinsically safe cluster lamps for use with conventional Zener barriers and galvanic isolators are also available, please refer to the BA390 datasheet. For safe area applications please refer to the BA590 datasheet.
**Power supply**

Current

4mA for specified performance. Current must be defined by external resistor or current limit. See Application Guide AG390 for typical outputs at other currents.

Max

22mA

Voltage

Operating 8V typical, 8.7V max

Reverse 60V max

**Output at 4mA**

Lamp colour

Typical at 150mm

Red 60 lux

Amber 38 lux

Green 42 lux

Blue 46 lux

White 56 lux

**Intrinsic safety**

Europe ATEX

Standard EN50020:1994

Code Group II Category 1G

Certificate number BAS01ATEX1062X

Installation May be powered from any EEx ia IIC certified source whose output parameters do not exceed:

Uo 30V dc

Po 1.3W at 40˚C ambient

Po 1.2W at 60˚C ambient

Gas group II A, IIB or IIC

Location Zone 0, 1 or 2

**USA FM**

Standard 3610 Entity

Code CL I: Div 1: GP A, B, C, & D: T4 @ 60˚C

File 3022662

Standard 3611 Nonincendive

Code CL I: Div 2: GP A, B, C, & D: T4 @ 60˚C

File 3022662

**Environmental**

Operating temperature -20 to 60˚C

Storage temperature -40 to 85˚C

Relative humidity 5 to 95% non condensing

Operating life 100,000 hours typical

Enclosure Front IP66

Rear IP20 - see accessories for optional IP65 rear sealing assembly.

EMC In accordance with EU Directive 89/336/EEC, full report available.

Immunity No degradation of brightness for 10V/m field strength

Emissions Electromagnetically benign

**Mechanical**

Terminals Screw clamp for 1.5mm²

Lens material Polycarbonate

Body material Nylon 6

Weight 18g

**Accessories**

Legend plate Will accommodate up to two rows of ten alphanumeric characters.

BA599 provides IP65 protection for terminals and rear of the lamp.

Supplied with gland for 7 to 12mm diameter cable.

**HOW TO ORDER**

Lamp colour

Red BA390RS

Amber BA390AS

Green BA390GS

Blue BA390BS

White BA390WS

Accessories Please specify if required

Legend plate

Rear sealing assembly

Example Model number & colour

Legend plate

BA390AS

Run
BA590 series cluster lamps are solid state panel mounting indicators which offer a high reliability alternative to conventional panel lamps incorporating a filament bulb. Very low current consumption and a ten year life minimise maintenance costs by totally eliminating routine bulb replacement. Each BA590 contains a group of high efficiency light emitting diodes mounted behind a coloured diffuser to produce a bright, uniform output with a typical life greater than ten years. All BA590 models contain a 20mA current regulator which maintains constant brilliance over a wide range of supply voltages.

Five well defined colours - red, amber, green, blue and white comply with the indicator light colour requirements specified in IEC204-1, allowing all plant conditions to be annunciated.

IP65 sealing of the lens and the joint between the lamp and the panel makes the BA590 ideal for installations in areas that will be hosed, washed or splashed. When environmental protection behind the panel is also required, an optional rear sealing assembly is available.

Mounting is via a single industry standard 22.5mm diameter hole. The lamp housing, fixing nut and terminals have a maximum diameter of 30mm which permits a very high packing density on the panel.

To aid identification from the rear of the panel, the model number and suffix which identifies the colour are marked on the lamp body close to the terminals.

The lamp function can be shown on an optional legend plate secured between the lamp and the panel. Plates can be supplied blank or typeset with up to two rows of ten alphanumeric characters.

Reliability is ensured by an ISO9001 approved quality control system supported by a three year guarantee.

If flammable atmospheres are present the complementary BA390 or BA390S intrinsically safe cluster lamps should be used. These have the same features as the BA590 but have been certified for installation in all gas hazardous areas.
**SPECIFICATION**

**BA590 - 24V dc**

**Power supply**
- Voltage: 14 to 30V dc
- Current: 18 to 22mA
- Reverse voltage: 60V max

**Output**
- Lamp colour: Typical at 150mm
  - Red: 150 lux
  - Amber: 150 lux
  - Green: 250 lux
  - Blue: 150 lux
  - White: 250 lux

**BA591 - 115V ac**

**Power supply**
- Voltage: 100 to 127V ac
- Current: 20mA average 0.7A peak

**Output**
- Lamp colour: Typical at 150mm
  - Red: 190 lux
  - Amber: 150 lux
  - Green: 250 lux
  - Blue: 150 lux
  - White: 300 lux

**Repetitive switching**: Once every 2 seconds max

**Operating temperature**: -20 to +50°C

**BA592 - 230V ac**

**Power supply**
- Voltage: 200 to 253V ac
- Current: 20mA average 1.4A peak

**Output**
- Lamp colour: Typical at 150mm
  - Red: 190 lux
  - Amber: 150 lux
  - Green: 250 lux
  - Blue: 150 lux
  - White: 300 lux

**Repetitive switching**: Once every 5 seconds max

**Operating temperature**: -20 to +50°C

**COMMON SPECIFICATION**

**Environmental**
- Operating temperature: -20 to +60°C
- Storage temperature: -40 to +60°C
- Humidity: To 95% at 40°C non-condensing
- Operating life: Typically 100,000 hours
- Enclosure: Front IP66
- Rear IP20 - see accessories for optional IP65 rear sealing assembly
- EMC: In accordance with EU Directive 89/336/EEC.
- Immunity: No degradation of brightness for 10V/m.
- Emissions: Electromagnetically benign
- Electrical safety: In accordance with EU Directive 73/23/EEC

**Mechanical**
- Terminals: Screw clamp for 1.5mm².
- Lens material: Polycarbonate
- Lamp body: Nylon 6
- Weight: 18g

**Accessories**
- Legend plate: Will accommodate up to two rows of ten alphanumeric characters.

**TERMINAL CONNECTIONS**

**HOW TO ORDER**

**Please specify**

<table>
<thead>
<tr>
<th>Model number</th>
<th>Colour</th>
<th>Model suffix</th>
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</thead>
<tbody>
<tr>
<td>BA590, BA591</td>
<td>Red</td>
<td>R</td>
</tr>
<tr>
<td></td>
<td>Amber</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Green</td>
<td>G</td>
</tr>
<tr>
<td></td>
<td>Blue</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>W</td>
</tr>
</tbody>
</table>

**Accessories**

| Legend plate | Rear sealing assembly |

**Example**

Model and colour: BA590R

---

**DIMENSIONS (mm)**

**BA590**

15 42

30

31 31

31

**BA591 & BA592**

30 7-12

30 15 80

Optional legend plate

Optional BA599 rear sealing assembly

Fixing centres for maximum packing density. Special tool may be required to tighten fixing nuts when minimum spacing is used.

---

**EMC**

In accordance with EU Directive 89/336/EEC.

---

**Immunity**

No degradation of brightness for 10V/m.

---

**Emissions**

Electromagnetically benign

---

**Electrical safety**

In accordance with EU Directive 73/23/EEC

---

**Mechanical**

Terminals: Screw clamp for 1.5mm².

Lens material: Polycarbonate

Lamp body: Nylon 6

Weight: 18g

---

**Accessories**

Legend plate

Rear sealing assembly

Example

Model and colour: BA590R
The BExS110D solid state electronic sounder produces a loud audible warning signal within a hazardous area. To avoid confusion between alarm signals, the sounder can be conditioned by internal switches to generate any one of thirty two unique alarm sounds. Maximum continuous output is 113dB(A) at 1m.

ATEX flameproof certification allows all models to be installed in Zone 1 or 2, and to be used with gases in groups IIA, IIB and IIC.

Second and third stage alarms are available on all models. This enables the alarm sound to be changed from within the safe or hazardous area, so that one sounder may be used to indicate three different alarm conditions.

Robust construction and IP67 protection allows BExS110D sounders to function reliably in severe environments. An adjustable wall mounting ‘U’ bracket is provided with every unit, and a stainless steel pipe mounting kit is available as an accessory. An optional stainless steel tag plate may be etched with any tag number or applicational information and secured to the sounder ‘U’ bracket. See accessory datasheet for full details.

A loudspeaker version of this sounder for use with 100V public address systems is also available.

Visit www.beka.co.uk to hear these tones
### SPECIFICATION

**Power supply**
- **Model**: 12V dc, 24V dc, 48V dc, 115V ac, 230V ac
- **Voltage**: 9 to 15V, 15 to 28V, 36 to 58V, 115V±10%, 230V±10%
- **Current**: 195mA, 250mA, 130mA, 110mA, 56mA

**Output**
- Continuously rated sound level at 1m: 110 ± 3dB(A) @ 1000Hz
- **Volume control**: Reduces output by 20dB(A).
- **Second & third stage alarms**
  - 24V dc model: By application of positive or negative dc voltage.
  - 115V & 230V models: By interconnection of sounder terminals.

**Certification flameproof**
- **Europe ATEX**
  - **Standard**: EN50014:1992, EN50018:1994
  - **Code**:
    - Group II Category 2G
    - EEExd IIC T4 Tamb –50 to +55˚C
    - or
    - Group II Category 2GD
    - EEEx d IIC T4 Ta <-55˚C
- **Cert. No.**: KEMA99ATEX7853

**Location**
- **Gas** Zone 1 or 2
- **Dust** Zone 21 or 22

**End of line monitoring**
- (24V dc model only): A resistor or diode may be fitted inside the sounder enclosure for monitoring line continuity. The resistor must have a minimum value of 3,300 Ω and a minimum power rating of 0.5W, or a minimum value of 500 Ω and a minimum power rating of 2 watts.

**Environmental**
- **Operating temperature**: -40 to +55˚C
- **Storage temperature**: -40 to +70˚C
- **Humidity**: 90% at 40˚C
- **Enclosure**: IP67 with two M20 tapped cable entries
- **Body**: Marine grade LM6
- **Fitting**: Stainless steel 316
- **EMC**: In accordance with EU Directive 89/336/EEC.
  - **Immunity**: EN50082-2: 1992
  - **Emissions**: EN55081-1: 1992

**Mechanical**
- **Terminals**: Screw clamp for one 4mm² or two 2.5mm² conductors.
- **Cable entry**: Two tapped M20
- **Weight**: 3.4kg

**Accessories**
- **Tag plate**: Etched stainless steel plate can be fitted to sounder ‘U’ bracket
- **Pipe mounting kit**: BA393 stainless steel heavy duty using ‘V’ bolt for 40-80mm outside diameter vertical or horizontal pipe

**TOTAL WEIGHT**: 3.4kg

### HOW TO ORDER

Please specify

<table>
<thead>
<tr>
<th>Certification &amp; Model No.</th>
<th>Please specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX gas certification</td>
<td>BExS110D</td>
</tr>
<tr>
<td>or ATEX gas &amp; dust</td>
<td>BExDS110D</td>
</tr>
<tr>
<td>certification</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage</th>
<th>12V dc; 24V dc; 48V dc; 115V ac or 230V ac</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tag plate</td>
<td>Legend required</td>
</tr>
<tr>
<td>Pipe mounting kit</td>
<td>BA393</td>
</tr>
</tbody>
</table>
The **BExBG05D** is a bright flashing xenon beacon for use in hazardous areas. Housed in a robust IP67 enclosure it is suitable for exterior mounting and may be fitted with coloured lenses to aid alarm identification.

**Main application** of the BExBG05D is to provide a visual warning in noisy areas where a sounder may not be heard, or to supplement a sounder warning. The beacon produces a regular bright flash once every second and will attract attention in most ambient lighting conditions.

**ATEX flameproof certification** allows the beacon to be installed in Zones 1, 2, 21 & 22 and to be used with most industrial gases.

**Higher output** 10 and 15 joule beacons are also available.
**Sounders, beacons and cluster lamps**

**Hazardous area Safe area**

**Supply**

**BExCS110-05D**

**Combined sounder and flashing beacon**

*Flameproof for use in gas & dust hazardous areas*

- Flameproof
  - ATEX gas
  - or ATEX gas & dust

- High output sounder
  - 110dB(A) typical
  - 5 joule Beacon

- IP67 protection

- 32 different sounds

- Second & third stage sounds

The BExCS110-05D is a flameproof combined sounder and flashing beacon for use in hazardous areas. Separate terminals for the sounder and beacon enable each to be controlled individually and a wide selection of lens colours plus 32 different sound outputs result in a versatile device which will satisfy most applicational requirements.

Three different sounds may be remotely selected so that one combined sounder and beacon can indicate three different alarm conditions. When maximum loudness is not required, the level may be reduced by an internal volume control.

The beacon produces a regular bright flash once every second and will attract attention in most lighting conditions.

**SPECIFICATION**

<table>
<thead>
<tr>
<th>Power Supply</th>
<th>24Vdc</th>
<th>115Vac</th>
<th>230Vac</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>20 to 28V dc</td>
<td>115V±10%</td>
<td>230V±10%</td>
</tr>
<tr>
<td>Current</td>
<td>250mA</td>
<td>110mA</td>
<td>56mA</td>
</tr>
<tr>
<td>Sounder</td>
<td>270mA</td>
<td>140mA</td>
<td>55mA</td>
</tr>
<tr>
<td>Beacon</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Output**

- Sounder: 110dB(A) nominal ±3dB at 1m
  - 32 selectable sounds
  - Three stage output
- Beacon: 5 joule Xenon at 1Hz
  - Choice of six lens colours: amber, blue, clear, green, red, yellow

**Certification flameproof**

- Code: Group II Category 2G
  - EExd IIB T4 Tamb –50 to +55°C
  - or Group II Category 2GD T100°C IP67
- Cert. No.: KEMAO1ATEX2223

**Location**

- Gas: Zone 1 or 2
- Dust: Zone 21 or 22

**End of line monitoring**

- A resistor or diode may be fitted inside the enclosure for monitoring line continuity. The resistor must have a minimum value of 3,300Ω and a minimum power rating of 0.5W, or a minimum value of 500Ω and a minimum power rating of 2W

**Environmental**

- Operating temp.: -50 to +55°C
- Storage temp.: -50 to +70°C
- Enclosure: IP67 with good resistance to high humidity & salt spray

**Mechanical**

- Enclosure material: Marine grade LM6 aluminium, chromated & powder coated finish.
- Horn: High impact UL94 V0 & SVA FR ABS Glass
- Lens guard & fittings: Stainless steel
- terminals: Screw clamp for 0.5 – 4mm² cables
- cable entry: Two M20, one fitted with stopping plug
- weight: 5kg

**Accessories**

- Pipe mounting kit: BA393 stainless steel heavy duty using “V” bolt for 40 - 80mm outside diameter vertical or horizontal pipe.
- Tag plate: Etched stainless steel plate fitted to beacon "U" bracket.

**HOW TO ORDER**

Please specify
- Certification & Model No.
  - ATEX gas cert. BExCS110-05D
  - or ATEX gas & dust certification. BExDCS110-05D
- Voltage: 24V dc; 115V ac or 230V ac
- Lens colour: Red; amber; yellow; green; blue or clear
- Accessories: Legend required

**NB Important note** The BExCS110-05D & BExDCS110-05D are not for sale, resale, installation or use within the United States of America as a sole, multiple integrated or incorporated unit.

**DIMENSIONS**

**BEKA associates**

BEKA associates Ltd. Old Carlton Rd. Hitchin, Hertfordshire, SG5 2DA, U.K. Tel. (01462) 438301 Fax (01462) 453971 e-mail sales@beka.co.uk www.beka.co.uk
Accessories are available for mounting and marking BEKA products. These include:

**Pipe mounting kits for field instruments**

**Laser etched stainless steel scale & tag plates**

**Thermally printed scale cards and escutcheons**

All BEKA instruments can be supplied with a thermally printed scale card or a laser etched scale plate to show the units of measurement. Although we can supply any legend, we suggest that for consistency the symbols and multipliers defined in ISO 1000-1992 are used. These are shown on the following page.

If requested, instruments can also be supplied marked with a tag number and applicational information.
**Recommended symbols for scale plates and cards:**

<table>
<thead>
<tr>
<th>SI UNITS</th>
<th>NON SI UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quantity</strong></td>
<td><strong>SI</strong></td>
</tr>
<tr>
<td>length</td>
<td>metre</td>
</tr>
<tr>
<td>mass</td>
<td>kilogram</td>
</tr>
<tr>
<td>time</td>
<td>second</td>
</tr>
<tr>
<td>electric current</td>
<td>ampere</td>
</tr>
<tr>
<td>frequency</td>
<td>hertz</td>
</tr>
<tr>
<td>pressure, stress</td>
<td></td>
</tr>
<tr>
<td>electric potential</td>
<td>volt</td>
</tr>
<tr>
<td>electric resistance</td>
<td>ohm</td>
</tr>
<tr>
<td>electric conductance</td>
<td>siemens</td>
</tr>
<tr>
<td>flux of magnetic induction</td>
<td>weber</td>
</tr>
<tr>
<td>magnetic flux density</td>
<td>tesla</td>
</tr>
<tr>
<td>Celsius temperature</td>
<td>degree</td>
</tr>
</tbody>
</table>

**Compound units**

Compound units formed by multiplication or division of two or more units will be represented as shown in the following examples:

- N.m
- m³/s
- L/h

**Common abbreviations**

| Gallons | Gal |
| Inches water gauge | in.wg |
| Parts per million | ppm |
| Potential hydrogen | pH |
| Pounds per square inch | psi |
| Relative humidity | %RH |

**MULTIPLIERS**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Prefix</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>$10^9$</td>
<td>giga</td>
<td>G</td>
</tr>
<tr>
<td>$10^6$</td>
<td>mega</td>
<td>M</td>
</tr>
<tr>
<td>$10^3$</td>
<td>kilo</td>
<td>k</td>
</tr>
<tr>
<td>$10^2$</td>
<td>hecto</td>
<td>h</td>
</tr>
<tr>
<td>10</td>
<td>deca</td>
<td>da</td>
</tr>
<tr>
<td>$10^{-1}$</td>
<td>deci</td>
<td>d</td>
</tr>
<tr>
<td>$10^{-2}$</td>
<td>centi</td>
<td>c</td>
</tr>
<tr>
<td>$10^{-3}$</td>
<td>milli</td>
<td>m</td>
</tr>
<tr>
<td>$10^{-6}$</td>
<td>micro</td>
<td>µ</td>
</tr>
<tr>
<td>$10^{-9}$</td>
<td>nano</td>
<td>n</td>
</tr>
<tr>
<td>$10^{-12}$</td>
<td>pico</td>
<td>p</td>
</tr>
</tbody>
</table>
BEKA field mounting instruments are housed in two types of enclosure. Instruments with a ‘C’ suffix e.g. BA374C are in a 124 x 122 mm GRP or aluminium enclosure. Instruments with a ‘D’ suffix e.g. BA304D are in a 212 x 141mm GRP enclosure incorporating a separate terminal compartment.

Scale and Tag Marking
Instruments with a ‘D’ suffix, apart from serial text displays, fieldbus displays and batch controllers, all have an escutcheon around the display which will accommodate scale and tag marking. If requested the instrument can be supplied with the escutcheon thermally printed to show units of measurement, tag number or applicational information.

For customers preferring traditional labeling, all ‘D’ instruments can be supplied with a custom laser etched stainless steel plate fitted to the front of the captive terminal cover.

Each plate can accommodate:

- 1 row of 10 alphanumeric characters 10mm high
- or 2 rows each of 15 alphanumeric characters 7mm high
- or 3 rows each of 24 alphanumeric characters 5mm high

Field instruments with a ‘C’ suffix are supplied with removable blank stainless steel plates above and below the display. If requested these plates can be laser etched to show units of measurement or applicational information.

Each plate can accommodate:

- 1 row of 9 alphanumeric characters 10mm high
- or 1 row of 13 alphanumeric characters 7mm high
- or 2 rows each of 18 alphanumeric characters 5mm high

Pipe mounting kits
These kits enable both ‘C’ and ‘D’ field mounting instruments to be mounted onto any vertical or horizontal pipe.

**BA392C**
Stainless steel bracket secured by two stainless steel worm drive hose clips for 60 to 80mm outside diameter vertical or horizontal pipe; mounts any ‘C’ field instrument. Usually suitable for clamping to a 2 inch internal diameter metal pipe.

**BA392D**
Stainless steel bracket secured by two stainless steel worm drive hose clips for 60 to 80mm outside diameter vertical or horizontal pipe; mounts any ‘D’ field instrument. Usually suitable for clamping to a 2 inch internal diameter metal pipe.

**BA393**
Heavy duty stainless steel pipe mounting bracket using a single ‘V’ bolt. Will clamp to any vertical or horizontal pipe with an outside diameter between 40 and 80mm. Will support ‘C’ and ‘D’ field mounting instruments and the BExS110D, BExBG05D and BExCS110-05D flameproof sounders and beacons.

Panel mounting kit for ‘C’ instruments
The BA394 enables a ‘C’ field mounting instrument to be mounted into a panel aperture.
Scale cards
All panel mounting instruments, except serial text displays, fieldbus displays, batch controllers and the BA369 battery powered clock, can be supplied with a typeset scale card showing the units of measurement e.g. °C, mBAR or L/min. If not specified at the time of ordering a blank card will be fitted.

In addition to a scale card the BA326C and BA526C combined analogue and digital indicators can be supplied with an analogue scale. Please specify the required graduations and units.

Panel meters A70, A75, A80 and A85 are supplied with a pre-printed set of scale labels containing most common units of measurements.

See list of recommended symbols on page 178.

Tag number or applicational information
All panel mounting instruments can be supplied with a customer specified thermally printed tag label which can accommodate up to:

- 1 row of 16 alphanumeric characters 2.7mm high
- or 2 rows of 22 alphanumeric characters 2mm high

Combining kit for joining BR385 sounder & BA386 beacon

HOW TO ORDER
Please specify

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale and tag plates</td>
<td>Legend required</td>
</tr>
<tr>
<td>Scale cards</td>
<td>Legend required</td>
</tr>
<tr>
<td>Tag label</td>
<td>Legend required</td>
</tr>
<tr>
<td>Pipe &amp; panel mounting kits</td>
<td>Model number</td>
</tr>
<tr>
<td>Sounder &amp; beacon combining kit.</td>
<td>Supplied free of charge on request when BR385 &amp; BA386 are ordered at the same time.</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Inside BEKA</td>
<td>2</td>
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<td>How to Order</td>
<td>3</td>
</tr>
<tr>
<td>Overseas</td>
<td>4</td>
</tr>
<tr>
<td>Europe</td>
<td>5</td>
</tr>
<tr>
<td>Asia Pacific, Africa &amp; Middle East</td>
<td>7</td>
</tr>
<tr>
<td>North &amp; South America</td>
<td>8</td>
</tr>
<tr>
<td>Loop Powered 4/20mA Indicators</td>
<td>9</td>
</tr>
<tr>
<td>Panel Meters</td>
<td>49</td>
</tr>
<tr>
<td>Manual Set Point Stations</td>
<td>59</td>
</tr>
<tr>
<td>Rate Totalisers, Loop Powered 4/20mA</td>
<td>65</td>
</tr>
<tr>
<td>Rate Totalisers, Battery Powered</td>
<td>77</td>
</tr>
<tr>
<td>Rate Totalisers, Externally Powered</td>
<td>83</td>
</tr>
<tr>
<td>Counters, Timers Tachometers &amp; Clocks</td>
<td>95</td>
</tr>
<tr>
<td>Fieldbus Indicators and Displays</td>
<td>105</td>
</tr>
<tr>
<td>Serial Text Displays</td>
<td>125</td>
</tr>
<tr>
<td>Flow Batch Controllers</td>
<td>137</td>
</tr>
<tr>
<td>Indicating Temperature Transmitters</td>
<td>149</td>
</tr>
<tr>
<td>Sounders, Beacons &amp; Cluster Lamps</td>
<td>161</td>
</tr>
<tr>
<td>Accessories</td>
<td>177</td>
</tr>
<tr>
<td>Index of all model numbers</td>
<td>Inside rear cover</td>
</tr>
</tbody>
</table>