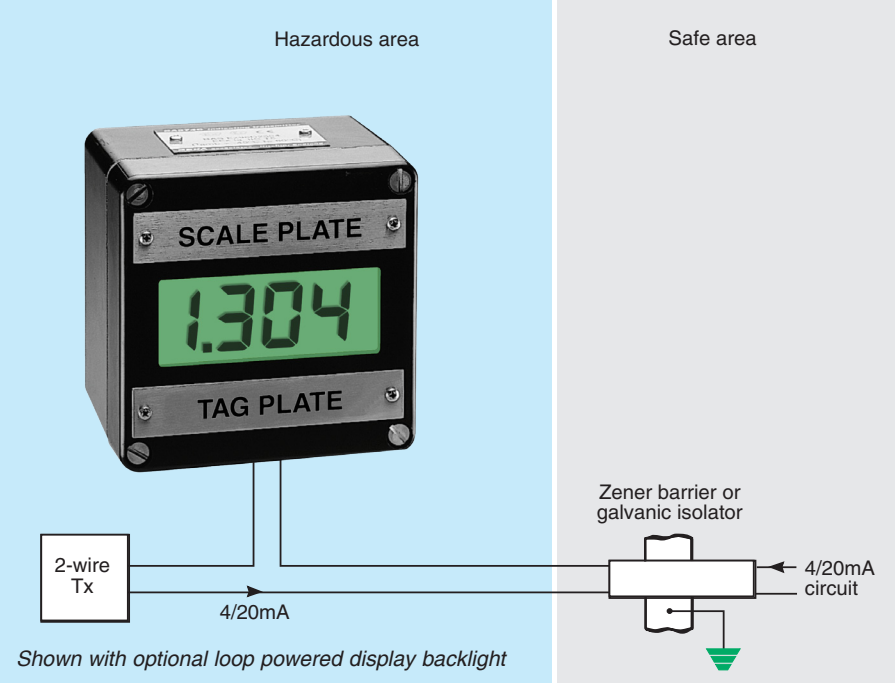

Shown with optional loop powered display backlight

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**

www.beka.co.uk/ba304c

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.

ATEX intrinsic safety certification allows installation throughout Europe. The two 4/20mA input terminals comply with the requirements for *simple apparatus* allowing the BA304C to be connected in series with most certified intrinsically safe 4/20mA loops. This, together with the low voltage drop, makes the BA304C 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 BA304C 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.

FM APPROVED

BEKA associates

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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

Code	Group II, Category 1G Ex ia IIC T5
Cert No	ITS02ATEX2027
Output parameters	
Uo	1.1V dc
Io	70mA dc
Po	23mW
Ceq	20nF
Leq	10µH
	Complies with requirements for 'Simple 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	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 see ERA test report 5046/228, NEMA 4 see OQ2A9.AX
EMC	In accordance with EU Directive 2004/108/EC, 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

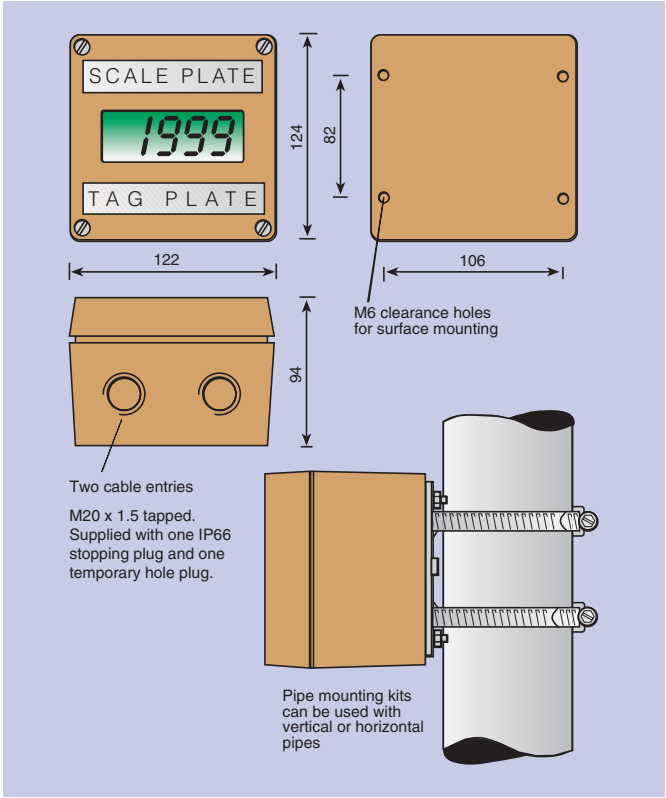
Mechanical

Terminals	Screw clamp for 0.5 to 2.5mm^2 cables
Weight	GRP enclosure 1kg Aluminium enclosure 1.3kg

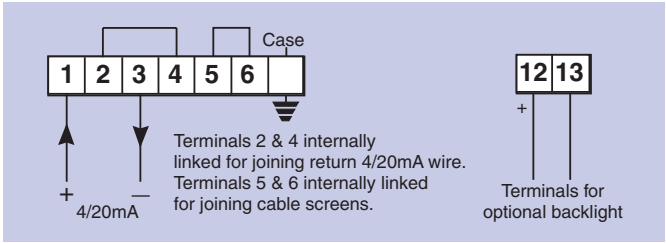
Accessories

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.
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)

DIMENSIONS (mm)



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 ORDER

	Please specify
Model number	BA304C
Enclosure	GRP or aluminium
Display at 4mA	XXXX
at 20mA	XXXX
	Include position of decimal point & sign if display is negative*

Accessories	**Please specify if required**
Backlight	Loop powered backlight or Separately powered backlight.
Root extractor	Root extractor
Calibrator	Calibrator
	Only one can be fitted
Scale plate	Legend
Tag plate	Legend
Pipe mounting kit	BA392C or BA393
Panel mounting kit	BA394

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