Indicating Temperature Transmitters

Intrinsically safe

Ex nA

Flameproof

General purpose

HART COMMUNICATION PROTOCOL

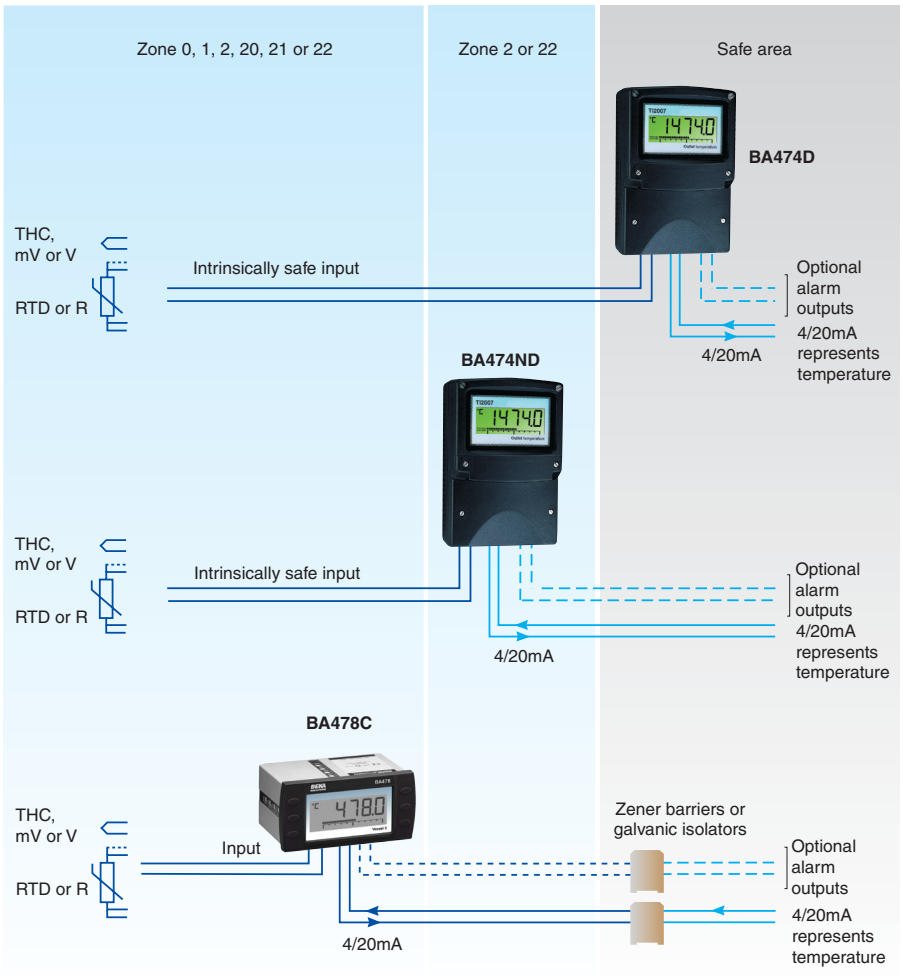
Field and panel mounting loop powered HART enabled temperature transmitters which incorporate a large easy to read temperature display. In addition to conventional Ex ia intrinsic safety certification, the field mounting BA474D also has associated apparatus certification. When installed in a safe area this permits it to be connected to a primary element in the hazardous area without the need for a Zener barrier or galvanic isolator. Similarly, when installed in Zone 2 the BA474ND may be connected to a primary element in Zone 0, 1 or 2, again without a Zener barrier or galvanic isolator.

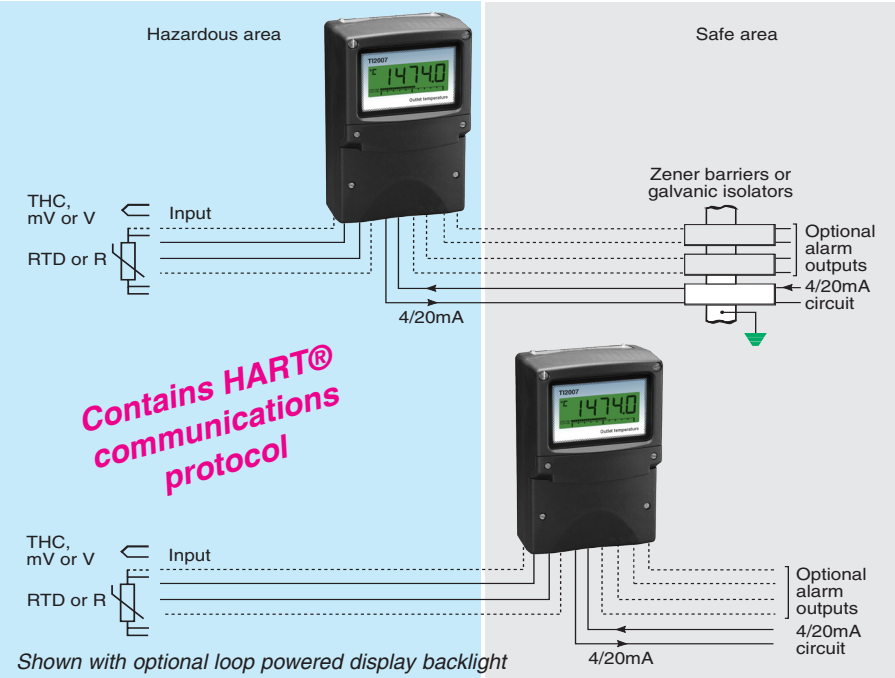
- **Large high contrast temperature display**
- **General purpose and certified hazardous area models**
  International Ex ia intrinsic safety and Ex nA non sparking certification
- **Field mounting models**
  Separate terminal compartment.
  Innovative certification eliminates need for barrier or isolator
- **Panel mounting models**
  IP66 front panels
- **HART communication**
  Sensor diagnostics
- **-20 to +60˚C operating temperature range**
- **Accessories**
  Dual isolated alarms
  Backlight loop powered
  Scale card - *can be supplied printed with units of measurement and tag information for no additional charge*
  Laser engraved stainless steel legend plates
  Pipe mounting kits

Models available

Model No.	Mounting	Certification					
		Europe ATEX		International IECEx		USA & Canada	
		Gas	Dust	Gas	Dust	Gas	Dust
Ex ia intrinsically safe - for use in Zones 0, 1 & 2 and 20, 21 & 22 where certified							
BA474D	Field	✔	✔	✔	✔	✔	✔
BA478C	Panel 144 x 72	✔	–	✔	–	✔	–
Ex nA - intrinsically safe input							
BA474ND	Field	✔	✔	✔	✔	–	–
General Purpose - for use in safe areas							
BA674D	Field						
BA678C	Panel 144 x 72						

*An **Indicating Temperature Transmitter***
*for every **application**. . . .delivered ready for **installation***





Shown with optional loop powered display backlight

BA474D

Indicating temperature transmitter

Intrinsically safe for use in gas & dust hazardous areas

AND

Associated apparatus for safe area mounting with RTD/THC in hazardous area without a Zener barrier or galvanic isolator

- **Large display**
- **4/20mA loop powered**
- **HART® communication**
- **Intrinsically safe**
  ATEX gas
  ***or* ATEX gas & dust**
  ***or* FM, cFM & ATEX gas**
- **Certified galvanic isolation.**
- **RTD, THC, voltage or resistance input.**
- **IP66 GRP enclosure with separate terminal compartment.**
- **Optional:**
  Loop powered backlight
  External push buttons
  Dual alarms
- **3 year guarantee**

www.beka.co.uk/ba474d

The new BA474D is a second generation, intrinsically safe, loop powered indicating temperature transmitter which replaces the BA374C. It provides an accurate local digital temperature display, plus a 4/20mA output, which may be scaled to represent any temperature range. Incorporating new facilities such as HART® digital communication, associated apparatus certification and a robust GRP enclosure with a separate terminal compartment, the BA474D remains electrically compatible with the earlier model.

The main application of the BA474D is to display temperature in a hazardous process area and to transmit a linearised 4/20mA current to the safe area. Associated apparatus certification also allows the BA474D to be installed in a safe area with the sensor in Zone 0, 1, 2, 20, 21 or 22 without the need for a Zener barrier or galvanic isolator greatly reducing the loop cost. The digital display may be in °C or °F with the units of measurement shown on the display. A separately programmable 31 segment bargraph provides an easy to read analogue indication of the process value and trend.

Calibration and configuration, including input type, may be performed via HART® communication or push buttons located behind a sealed cover. For applications requiring frequent adjustment the transmitter can be supplied with external push buttons. The BA474D also accepts voltage and resistance inputs so that pressure, weight or position tranducer outputs may be displayed in engineering units and transmitted as a 4/20mA current.

HART® digital communication provides the primary temperature measurement in a digital format plus diagnostic information indicating the health of the sensor and the transmitter.

Sensor diagnostics are continuously performed by the BA474D transmitter, generally as specified by NAMUR standard NE107 and transmitted via the HART® communications link. Faults may also be indicated by outputting an under or over range current and flashing the transmitter display.

International intrinsic safety certification allows the BA474D to be installed worldwide in most hazardous areas and to be used with most flammables gases and combustible dusts. Associates apparatus certification also permits a hazardous area RTD/THC to be connected to a safe area BA474D transmitter without the need for Zener barriers or galvanic isolators.

An optional loop powered backlight produces green background illumination enabling the display to be read at night and in poor lighting conditions. It does not require additional field wiring or a power supply, but the transmitter minimum operating voltage is increased.

Dual Alarms are available as an option. Each has a galvanically isolated, solid state, single pole output that may be independently conditioned as a high or low alarm with a normally open or closed output. Annunciators on the instrument display show the status of both alarms.

Tag number and application can be marked onto the display escutcheon prior to despatch or after installation. Alternatively the instrument can be supplied with a removable blank or custom etched stainless steel legend plate mounted on the front of the enclosure.

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

SPECIFICATION

Supply voltage

Without backlight	9 to 28V
With backlight	15.5 to 28V

Output

Operating range	3.8 to 20.5mA
Resistance	5MΩ min

Display

Type	Liquid crystal 20mm high -99999 to 99999 31 segment bargraph
Reading rate	2 per second
Resolution	
RTD & THC input	Selectable 0.1° or 1°
Voltage & resistance input	Fully selectable

Input

Resistance thermometer	
Pt100 or Pt1000	-200 to 850°C
Connection	3 or 4 wires, or differential
Excitation current	175µA
Resistance	Adjustable between 0 & 5kΩ
Min span	10Ω
Thermocouple	

Type	Range °C
B	200 to 1820
E	-200 to 1000
J	-210 to 1200
K	-200 to 1372
N	-200 to 1300
R	-50 to 1768
S	-50 to 1768
T	-200t o 400

Voltage	Adjustable between ±1.9V
Minimum span	2mV

HART® communication HART Registered, compliant with HART protocol standard revision 7.

Diagnostics Generally as NAMUR NE 107. Output via HART® and under or over range output current

Performance

Accuracy RTD input	±0.1°C		
THC input	±10µV		
Effect of temperature on display			
	Voltage	THC	RTD
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			
Zero drift	<20ppm/ °C		
Span drift	<50ppm/ °C		
Series mode ac rejection	<0.1% error for 150mV rms 50 or 60Hz.		
Common mode ac rejection	<0.1% error for 250V 50 or 60Hz.		

Intrinsic safety

Europe ATEX

Code	for gas	II 1G, Ga Ex ia IIC T5 II (1)G, (Ga) [Ex ia] IIC *(associated apparatus)* Ta = -40 to 70°C
or	for dust	II 1D, Ex iaD 20 T80°C IP66 II (1) D, [Ex iaD] *(associated apparatus)* Ta = -20 to 60°C
Certificate No.		ITS09ATEX26155

USA FM

Standard	3610 Entity
Code	CL I, II, III; Div 1; GP A, B, C, D, E, F & G T4 @ 70°C
Associated apparatus	Input may be directly connected to sensor in: CL I, II, III; Div 1; GP A, B, C, D, E, F & G
File	3035396
Standard	3611 Nonincendive
Code	CL I; Div 2; GP A, B, C, D, E, F & G T4 @ 70°C
Intrinsically safe input	Input may be directly connected to sensor in: CL I, II, III; Div 1; GP A, B, C, D, E, F & G
File	3035396

Canada cFM

File	3035396C

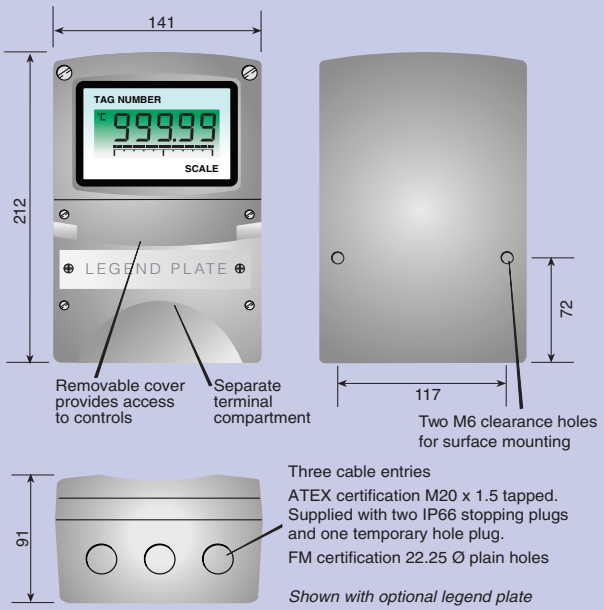
International IECEx

Code	for gas	Ga Ex ia IIC T5 [Ex ia Ga] IIC *(associated apparatus)* Ta = -40 to 70°C
or	for dust	Ex ia IIIC T80°C Da IP66 [Ex ia Da]IIIC *(associated apparatus)* Ta = -20 to 60°C
Certificate No.		IECExITS 09.0005 *Option see How to Order*

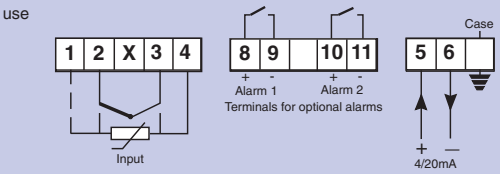
Environmental

Operating temp	-40 to 70°C
Storage temp	-40 to 85°C
Humidity	To 95%
Enclosure	IP66 (see ITS report C871V0383)
EMC	In accordance with EU Directive 2004/108/EC.

DIMENSIONS (mm)



TERMINAL CONNECTIONS



Mechanical

Terminals	Screw clamp for 0.5 to 1.5mm² cable
Weight	1.6kg

Accessories

Loop powered backlight	Operating voltage increased to 15.5V min
Dual alarm	Isolated, solid state single pole
Ron	< 8Ω + 1.2V
Roff	> 180k
External push buttons	Membrane keypad~
Scale legend	Units marked onto display escutcheon. ~ *Note: For RTD & THC inputs, °C or °F is shown on the instrument display.*
Stainless legend plate	Etched with tag number on front of instrument. ~
Pipe mounting kit	BA392D or BA393. ~

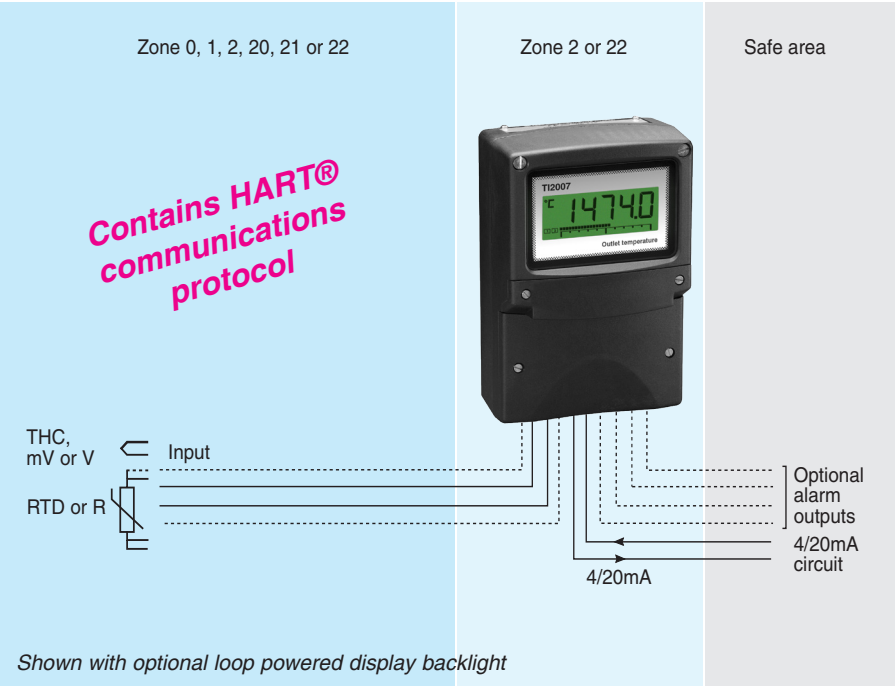
~ See accessory datasheet for details

HOW TO ORDER

		Please specify
Model number		BA474D
Certification		ATEX & IECEx gas
	or	ATEX & IECEx gas & dust
	or	FM, cFM & ATEX gas
Input		RTD; THC & type; V or R*
CJ compensation		On or Off. [THC input only]*
Display units		°C or °F [RTD/THC only]*
Display at which output is:		
4mA		XXXXX
20mA		XXXXX
Display at which bargraph:		
Starts		XXXXX
Finishes		XXXXX
Fault indication		Off; under range or over range

Accessories	**Please specify if required**
Backlight	Backlight
Dual alarm	Alarms
External push buttons	External push buttons
Scale legend	Legend
Stainless legend plate	Legend
Pipe mounting kit	BA392D or BA393

* *If calibration is not requested, BA474D will be set for 3 wire Pt100 RTD input with 4/20mA output and bargraph corresponding to a display of 0.0 to 100.0°C, with no fault indication.*



Shown with optional loop powered display backlight

BA474ND

Indicating temperature transmitter

Type nA certified for installation in Zone 2 & 22 hazardous areas

Intrinsically safe input allows sensor to be installed in any gas or dust hazardous area

- **Large display**
- **4/20mA loop powered**
- **HART® communication**
- **ATEX & IECEx certification**
  - **Transmitter: Ex nA**
  - **Sensor input: Ex ia & Ex iaD**
- **RTD, THC, voltage or resistance input.**
- **IP66 GRP enclosure with separate terminal compartment.**
- **Optional:**
  - **Loop powered backlight**
  - **External push buttons**
  - **Dual alarms**
- **3 year guarantee**

www.beka.co.uk/ba474nd

The new BA474ND is a second generation Type n loop powered indicating temperature transmitter which provides an accurate local digital temperature display plus a 4/20mA output. Incorporating a galvanically isolated intrinsically safe input that permits direct connection to measuring elements in any gas or dust hazardous Zone, this new instrument will cost effectively satisfy many hazardous area temperature measuring and display applications. HART® digital communication and a robust GRP enclosure with a separate terminal compartment further extend the many applications.

The main application of the BA474ND is to display temperature in a Zone 2 hazardous process area and to transmit a linearised 4/20mA current to the safe area. For installations where the operator and instrumentation are located in Zone 2 or 22, but the measuring element is in Zone 0, 20, 1 or 21, the BA474ND certified isolation allows direct connection to the sensor without the need for barriers or isolators, thus significantly simplifying installation and reducing cost. Easy on-site conditioning enables the transmitter to operate with three or four wire resistance thermometers or with most common types of thermocouple. Differential measurements can also be made. Voltage and resistance inputs from pressure, weight or position transducers may be displayed in engineering units and transmitted as a 4/20mA current and HART® digital signal.

Calibration and conditioning may be performed via HART® communication or from the four internal push buttons that are located behind a sealed front cover. For applications requiring frequent adjustments, the instrument can be supplied with optional external membrane push buttons. All instrument functions and calibration, including the type of input, are configurable on-site which reduces the instrument inventory.

HART® digital communication provides the primary temperature measurement in a digital format plus diagnostic information indicating the health of the measuring element and the transmitter. HART® communication also enables the BA474ND to be configured and calibrated from a portable HART® communicator or from the system host. If HART® digital communication is not required, the BA474ND will function as a traditional 4/20mA analogue loop powered indicating temperature transmitter.

Sensor diagnostics are continuously performed by the BA474ND transmitter, generally as specified by NAMUR standard NE107 and transmitted via the HART® communications link. Faults may also be indicated by outputting an under or over range current and flashing the transmitter display.

Ex nA and tD certification permits the BA474ND transmitter to be installed in Zone 2 gas and Zone 22 dust hazardous areas. The transmitter has certified internal galvanic isolation and an intrinsically safe Ex ia sensor input allowing direct connection to resistance thermometers and thermocouples installed in Zones 0, 1, 2. 20, 21 & 22.

The liquid crystal display has large digits plus a 31 segment bargraph which are designed to provide maximum contrast and a wide viewing angle. An optional loop powered backlight provides green background illumination making the display readable at night and in poor lighting conditions. The backlight does not require additional field wiring or a power supply, but the minimum operating voltage of the transmitter is increased.

Dual Alarms are available as an option. Each has a galvanically isolated, solid state, single pole output that may be independently conditioned as a high or low alarm with a normally open or closed output. Annunciators on the instrument display show the status of both alarms.

Tag number and application can be marked onto the display escutcheon prior to despatch or after installation. Alternatively, for customers who prefer an etched stainless steel label, the transmitter can be supplied with a removable blank or custom etched stainless steel legend plate mounted on the front of the enclosure.

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SPECIFICATION

Supply voltage
- Without backlight: 9 to 30V
- With backlight: 15.5 to 30V

Output
- Operating range: 3.8 to 20.5mA
- Resistance: 5MΩ min

Display
- Type: Liquid crystal 20mm high -99999 to 99999 31 segment bargraph
- Reading rate: 2 per second

Input
- Resistance thermometer
  - Pt100 or Pt1000: -200 to 850°C
  - Connection: 3 or 4 wires, or differential
  - Excitation current: 175µA
- Resistance: Adjustable between 0 & 5kΩ
  - Min span: 10Ω
- Thermocouple

Type	Range °C
B	200 to 1820
E	-200 to 1000
J	-210 to 1200
K	-200 to 1372
N	-200 to 1300
R	-50 to 1768
S	-50 to 1768
T	-200 to 400

- Voltage: Adjustable between ±1.9V
  - Min span: 2mV

HART® communication: HART Registered, compliant with HART protocol standard revision 7.

Diagnostics: Generally as NAMUR NE107
Output via HART® and under or over range output current

Performance
- Accuracy
  - RTD input: ±0.1°C
  - THC input: ±10µV
- Effect of temperature on display

	Voltage	THC	RTD
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
  - Zero drift: <20ppm/°C
  - Span drift: <50ppm/°C
- Series mode ac rejection: <0.1% error for 150mV rms 50 or 60Hz
- Common mode ac rejection: <0.1% error for 250V rms 50 or 60Hz

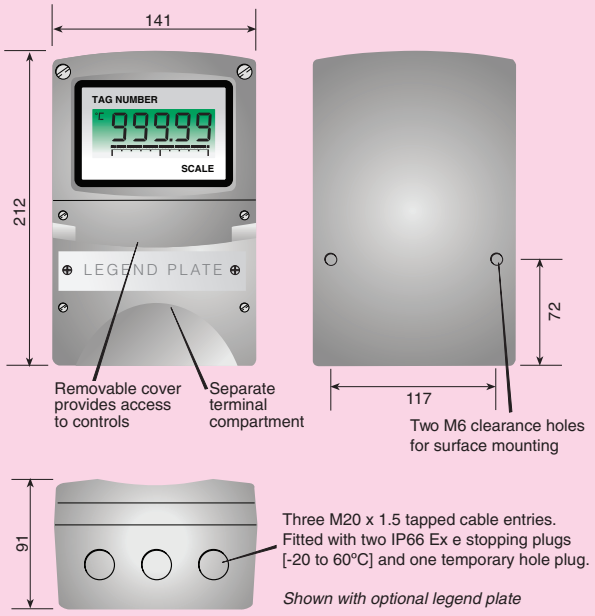
Certification
Europe ATEX
- Transmitter
  - Code: II 3 GD, Ex nA nL [ia] IIC T5
    Ex tD [iaD] A22 IP66 T80°C
    Ta = -20 to 60°C
- Sensor input
  - Code: II (1) G [ia] IIC T5
    II (1) D [iaD]
- Certificate No.: ITS09ATEX46157

International IECEx
- Transmitter
  - Code: Ex nA nL [ia] IIC T5
    Ex tD [iaD] A22 IP66 T80°C
    Ta = -20 to 60°C
- Sensor input
  - Code: [ia] IIC T5
    [iaD]
- Certificate No.: IECEx ITS 09.0007

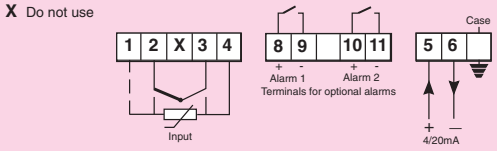
Environmental
- Operating temp: -20 to 60°C
- Storage temp: -40 to 85°C
- Humidity: To 95%
- Enclosure: IP66 (see ITS report C871V0383)
- EMC: In accordance with EU Directive 2004/108/EC

Mechanical
- Terminals: Screw clamp for 0.5 to 1.5mm^2 cable
- Weight: 1.6kg

DIMENSIONS (mm)



TERMINAL CONNECTIONS



Accessories

Loop powered backlight	Transmitter operating voltage increased to 15.5V min
Dual alarm	Isolated, solid state single pole
Ron	< 8Ω + 1.2V
Roff	> 180k
External push buttons	Membrane keypad ~
Scale legend	Units of measurement marked onto display escutcheon. ~ *Note: For RTD & THC inputs, °C or °F is shown on the instrument* display.
Stainless legend	Etched with tag number on front of instrument. ~
Pipe mounting kit	BA392D or BA393.~

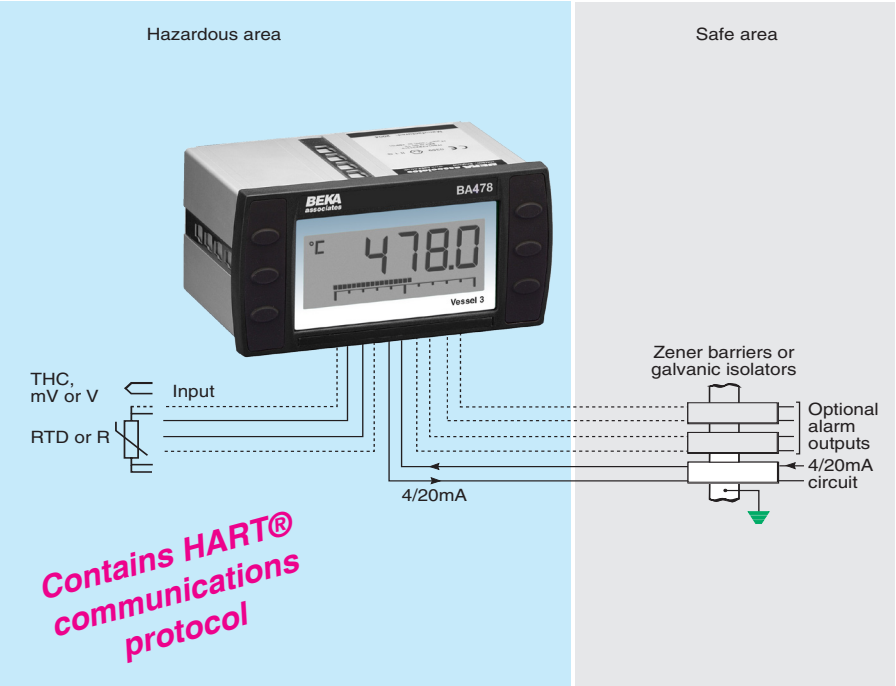
~ See accessory datasheet for details

HOW TO ORDER

	Please specify
Model number	BA474ND
Input	RTD; THC & type; V or R*
CJ compensation	On or Off [THC input only]*
Display units	°C or °F* [For RTD or THC input]
Display at which output is:	
4mA	XXXXX
20mA	XXXXX
Display at which bargraph:	
Starts	XXXXX
Finishes	XXXXX
Fault indication	Off; under range or over range

Accessories	**Please specify if required**
Backlight	Backlight
Dual alarm	Alarms
External push buttons	External push buttons
Scale legend	Legend
Stainless legend plate	Legend
Pipe mounting kit	BA392D or BA393
Application Guide AG310 Installation of [extra low voltage dc] Ex nA instrumentation	AG310

* *If calibration information is not supplied, the BA474ND will be conditioned for 3 wire Pt100 RTD input with a 4 to 20mA output and bargraph corresponding to a display of 0.0 to 100.0°C with no fault indication.*



BA478C

Indicating temperature transmitter

Intrinsically safe for use in all gas hazardous areas

- **Large display with bargraph.**
- **4/20mA loop powered**
- **HART® communication & sensor diagnostics.**
- **Intrinsically safe ATEX, FM, cFM & IECEX.**
- **RTD, THC, voltage or resistance input.**
- **Optional:**
  Loop powered backlight
  Dual alarms
- **144 x 72mm DIN enclosure with IP66 front.**
- **3 year guarantee**

www.beka.co.uk/ba478c

The new BA478C is a second generation panel mounting intrinsically safe loop powered indicating temperature transmitter which replaces the BA378C. It provides an accurate local digital temperature display, plus a 4/20mA output that may be scaled to represent any temperature range. Although incorporating new facilities such as HART® digital communication, diagnostics and a robust enclosure with an IP66 front, the BA478C remains electrically and mechanically compatible with the earlier model.

The main application of the BA478C is to display temperature in a hazardous process area and to transmit a linearised 4/20mA current to the safe area. The digital display may be in °C or °F with the units of measurement shown on the display. A separately programmable 31 segment bargraph provides an easy to read analogue indication of the process value and trend.

Calibration and conditioning may be performed via HART® communication or the front panel push buttons. All instrument functions and calibration, including the type of input, are configurable on-site thus reducing the instrument inventory. The transmitter will operate with three or four wire resistance thermometers and with most common types of thermocouple. Differential measurements can also be made. The BA478C accepts voltage and resistance inputs allowing pressure, weight or position tranducer outputs to be displayed in engineering units and transmitted as a 4/20mA current and HART® signal.

HART® digital communication provides the primary temperature measurement in a digital format plus diagnostic information indicating the health of the sensor and the transmitter.

Sensor diagnostics are continuously performed by the BA478C transmitter, generally as specified by NAMUR standard NE107 and transmitted via the HART® communications link. Faults may also be indicated by outputting an under or over range current and flashing the transmitter display.

International intrinsic safety certification allows the BA478C and the associated sensor to be installed in most gas hazardous areas. The transmitter may be powered from a certified Zener barrier, or from a certified galvanic isolator that must be a 'smart' device if HART® communication is used.

The front panel is a robust Noryl moulding containing an armoured glass window which provides IP66 protection. A neoprene gasket seals the joint between the BA478C and the mounting panel allowing the transmitter to be installed in areas that will be cleaned with a hose.

An optional loop powered backlight produces green background illumination enabling the display to be read at night and in poor lighting conditions. It does not require additional field wiring or a power supply, but the transmitter minimum operating voltage is increased.

Dual Alarms are available as an option. Each has a galvanically isolated, solid state, single pole output that may be independently conditioned as a high or low alarm with a normally open or closed output. Annunciators on the instrument display show the status of both alarms.

Degrees Centigrade or Fahrenheit may be shown on the instruments display when thermocouple or resistance thermometer inputs are selected. Other units of measurement and tag or applicational information can be economically marked onto the display escutcheon prior to despatch or after installation on-site.

BEKA associates

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SPECIFICATION

Supply voltage
- Without backlight: 9 to 28V
- With backlight: 15.5 to 28V

Output
- Operating range: 3.8 to 20.5mA
- Resistance: 5MΩ min

Display
- Type: Liquid crystal 20mm high -99999 to 99999 31 segment bargraph
- Reading rate: 2 per second
- Resolution
  - RTD & THC input: Selectable 0.1° or 1°
  - Voltage & Resistance input.: Fully selectable

Input
- Resistance thermometer
  - Pt100 or Pt1000: -200 to 850°C
  - Connection: 3 or 4 wires, or differential
  - Excitation current: 175µA
- Resistance: Adjustable between 0 & 5kΩ
  - Min span: 10Ω
- Thermocouple

Type	Range °C
B	200 to 1820
E	-200 to 1000
J	-210 to 1200
K	-200 to 1372
N	-200 to 1300
R	-50 to 1768
S	-50 to 1768
T	-200 to 400

- Voltage: Adjustable between ±1.9V
  - Minimum span: 2mV

HART® communication: HART Registered, compliant with HART protocol standard revision 7.

Diagnostics: Generally as NAMUR NE107. Output via HART® and under or over range output current.

Performance
- Accuracy
  - RTD input: ±0.1°C
  - THC input: ±10µV
- Effect of temperature on display

	Voltage	THC	RTD
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
  - Zero drift: <20ppm/°C
  - Span drift: <50ppm/°C
- Series mode ac rejection: <0.1% error for 150mV rms 50 or 60Hz
- Common mode ac rejection: <0.1% error for 250V rms 50 or 60Hz

Intrinsic safety

Europe ATEX
- Code: II 1 G, Ex ia IIC T5 Ga, Ta = -40 to 70°C
- Certificate No.: ITS09ATEX26156X

USA FM
- Standard: 3610 Entity
- Code: CL I, II, III; Div 1; GP A, B, C & D T4 @ 70°C
- File: 3035396
- Standard: 3611 Nonincendive
- Code: CL I; Div 2; GP A, B, C & D T4 @ 70°C
- File: 3035396

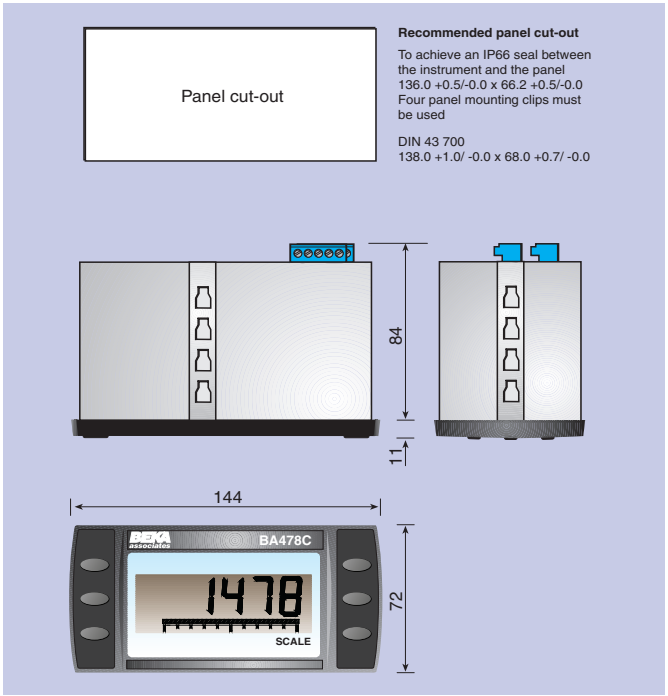
Canada cFM
- File: 3035396C

International IECEx
- Code: x ia IIC T5 Ga, Ta = -40 to 70°C
- Certificate No.: IECEx ITS 09.0006X

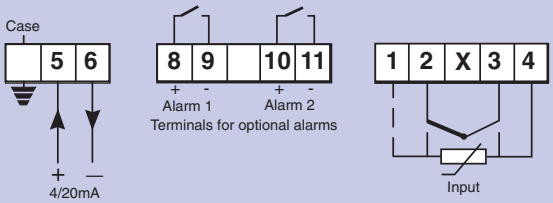
Environmental
- Operating temp: -40 to 70°C
- Storage temp: -40 to 85°C
- Humidity: To 95% non condensing
- Enclosure
  - Front: IP66
  - Rear: IP20
- EMC: Complies with EMC Directive 2014/30/EU

Mechanical
- Terminals: Screw clamp for 0.5 to 1.5mm^2 cable
- Weight: 0.7kg

DIMENSIONS (mm)



TERMINAL CONNECTIONS



Accessories
- Loop powered backlight: Operating voltage increased to 15.5V min.
- Dual alarm: Isolated, solid state single pole
  - Ron: < 5Ω + 0.6V
  - Roff: > 180k
- Scale legend: Units of measurement or application marked onto display escutcheon. ~ *Note: For RTD & THC inputs, °C or °F is shown on the instrument display.*
- Tag strip: Thermally printed legend on rear of instrument

~ See accessory datasheet for details

HOW TO ORDER

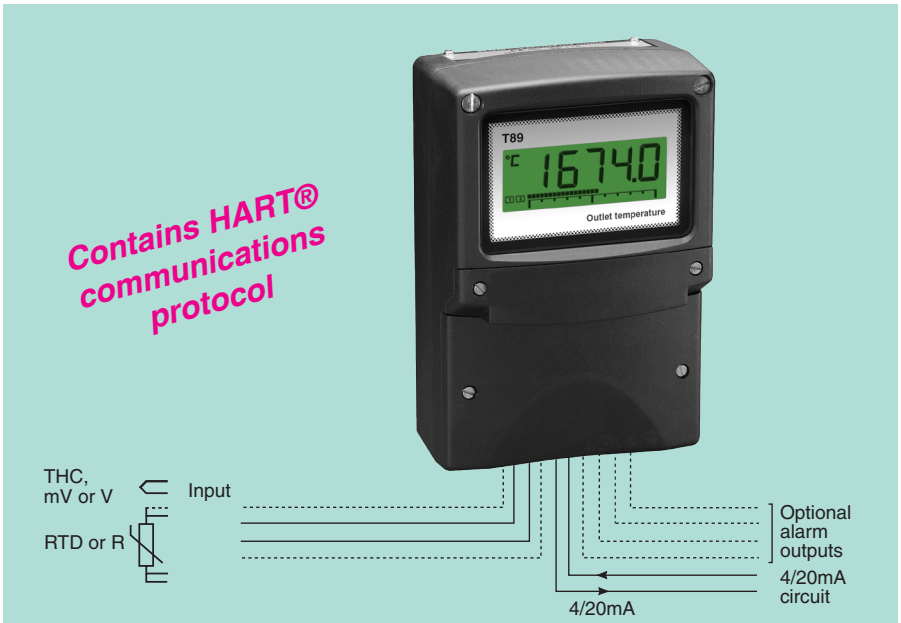
	Please specify
Model number	BA478C
Input	RTD; THC & type; V or R*
CJ compensation	On or Off *[THC input only]**
Display units	°C or °F* [RTD or THC inputs]
Display at which output is:	
4mA	XXXXX
20mA	XXXXX
Display at which bargraph:	
Starts	XXXXX
Finishes	XXXXX
Fault indication	Off; under range or over range
Accessories	**Please specify if required**
Display backlight	Backlight
Dual alarms	Alarms
Escutcheon marking	Legend *Note: For RTD & THC inputs, °C or °F may be shown on the instrument* display.
Tag strip	Legend

** If calibration information is not supplied, instrument will be conditioned for 3 wire Pt100 RTD input with a 4 to 20mA output and bargraph corresponding to a display of 0.0 to 100.0°C, with no fault indication.*

BA674D

Indicating temperature transmitter

General purpose



Shown with optional loop powered backlight

- **Large display with bargraph.**
- **4/20mA loop powered**
- **HART® communication & sensor diagnostics.**
- **RTD, THC, voltage or resistance input.**
- **Galvanically isolated sensor input.**
- **IP66 GRP enclosure with separate terminal compartment.**
- **Optional:**
  - **Loop powered backlight**
  - **External push buttons**
  - **Dual alarm.**
- **3 year guarantee**

www.beka.co.uk/ba674d

The new BA674D is a second generation, loop powered indicating temperature transmitter which replaces the BA574C. It provides an accurate local digital temperature display, plus a 4/20mA output, which may be scaled to represent any temperature range. Incorporating new facilities such as HART® digital communication and a robust GRP enclosure with a separate terminal compartment, the BA674D remains electrically compatible with the earlier model.

The main application of the BA674D is to display temperature in a process area and to transmit a linearised 4/20mA current to other instruments. The digital display may be in °C or °F with the units of measurement shown on the display. A separately configurable 31 segment bargraph provides an easy to read analogue indication of the process value and trend.

Calibration and conditioning may be performed via HART® communication or four push buttons protected from damage and tampering behind a sealed cover. For applications requiring frequent adjustment the transmitter can be supplied with external push buttons. All instrument functions and calibration, including the type of input, are configurable on-site thus reducing the instrument inventory. The transmitter will operate with three or four wire resistance thermometers and with most common types of thermocouple. Differential and average measurements can also be made. The BA674D also accepts voltage and resistance inputs so that pressure, weight or position transducer outputs may be displayed in engineering units and transmitted as a 4/20mA current.

Input galvanic isolation eliminates errors caused by common mode voltages up to 250V, allowing accurate measurement from earthed thermocouples in electrically noisy environments. Isolation also allows the transmitter to accurately display the output from earthed bridges.

HART® digital communication provides the primary temperature measurement in a digital format plus diagnostic information indicating the health of the sensor and the transmitter. HART® communication also enables the BA674D to be configured and calibrated from a portable calibrator or from the system host. If HART® digital communication is not required, the BA674D will function as a traditional 4/20mA analogue loop powered indicating temperature transmitter.

Sensor diagnostics are continuously performed by the BA674D transmitter generally as recommended by NAMUR standard NE 107 and the results transmitted via the HART® communication link. Faults may also be indicated by outputting an under or over range current and flashing the transmitter display.

An optional loop powered backlight produces green background illumination enabling the display to be read at night and in poor lighting conditions. It does not require additional field wiring or a power supply, but the transmitter minimum operating voltage is increased.

Dual Alarms are available as an option. Each has a galvanically isolated, solid state, single pole output that may be independently conditioned as high or low alarm with a normally open or closed output. Annunciators on the instrument display show the status of both alarms.

Tag number and application can be marked onto the display escutcheon prior to despatch or after installation. Alternatively, for customers who prefer an etched stainless steel label, the transmitter can be supplied with a removable blank or custom etched stainless steel legend plate mounted on the front of the enclosure. When the transmitter is conditioned for a resistance thermometer or thermocouple input, degrees Centigrade or degrees Fahrenheit can be shown on the liquid crystal display.

If explosive atmospheres are present either the intrinsically safe BA474D or the Type nL BA474ND should be used. Both have the same features as the BA674D but have been certified for use in gas and dust hazardous areas.

BEKA associates

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SPECIFICATION

Supply voltage

Without backlight	9 to 28V
With backlight	15.5 to 28V

Output

Operating range	3.8 to 20.5mA
Resistance	5MΩ min

Display

Type	Liquid crystal 20mm high -99999 to 99999 31 segment bargraph
Reading rate	2 per second
Resolution	
RTD & THC input	Selectable 0.1° or 1°
Voltage & resistance input	Fully selectable

Input

Galvanic isolation	500V
Resistance thermometer	
Pt100 or Pt1000	-200 to 850°C
Connection	3 or 4 wires, or differential
Excitation current	175µA
Resistance	Adjustable between 0 & 5kΩ
Min span	10Ω

Thermocouple

Type	Range °C
B	200 to 1820
E	-200 to 1000
J	-210 to 1200
K	-200 to 1372
N	-200 to 1300
R	-50 to 1768
S	-50 to 1768
T	-200 to 400

Voltage	Adjustable between ±1.9V
Minimum span	2mV

HART® communication HART Registered, compliant with HART protocol standard revision 7.

Diagnostics Generally as NAMUR NE 107. Output via HART® and under or over range output current.

Performance

Accuracy RTD input	±0.1°C
THC input	±10µV

Effect of temperature on display

	Voltage	THC	RTD
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	
Zero drift	<20ppm/ °C
Span drift	<50ppm/ °C
Series mode ac rejection	<0.1% error for 150mV rms 50 or 60Hz.
Common mode ac rejection	<0.1% error for 250V 50 or 60Hz.

Environmental

Operating temp	-40 to 70°C
Storage temp	-40 to 85°C
Humidity	To 95%
Enclosure	IP66 (see ITS report C871V0383)
EMC	In accordance with EU Directive 2004/108/EC

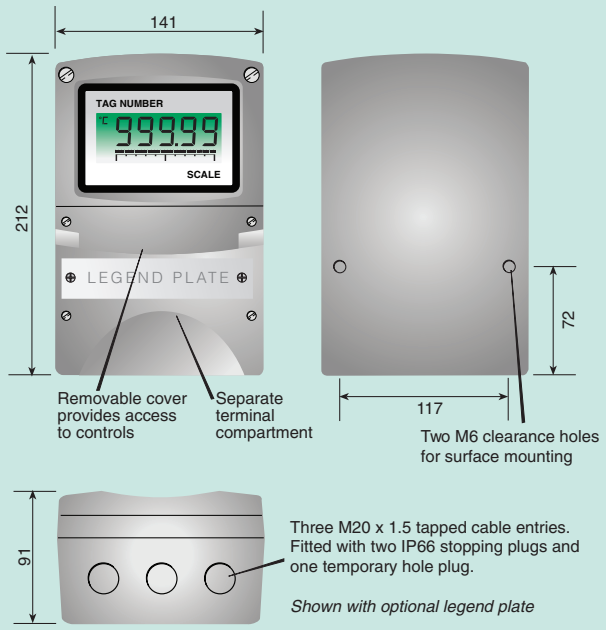
Mechanical

Terminals	Screw clamp for 0.5 to 1.5mm^2 cable.
Weight	1.6kg

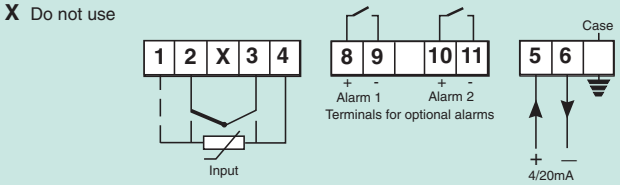
Accessories

Loop powered backlight	Green background illumination, increases operating voltage to 15.5V min.
Dual alarm	Isolated, solid state single pole
Ron	< 8Ω + 1.2V
Roff	>180k
Rating	30V dc; 100mA
External push buttons	Membrane keypad ~
Scale legend	Units marked onto display escutcheon~ *Note: For RTD & THC inputs, °C or °F is shown on the instrument display.*

DIMENSIONS (mm)



TERMINAL CONNECTIONS



Stainless legend plate.	Etched with tag number on front of instrument. ~
Pipe mounting kit	BA392D or BA393. ~

~ *See accessory datasheet for details*

HOW TO ORDER

	Please specify
Model number	BA674D
Input	RTD, THC & type; V or R*
CJ compensation	On or Off [THC input only]*
Display units	°C or °F* [RTD or THC inputs]
Display at which bargraph:	
Starts	XXXXX
Finishes	XXXXX
Display at which output is:	
4mA	XXXXX
20mA	XXXXX
Fault indication	Off; underrange or overrange

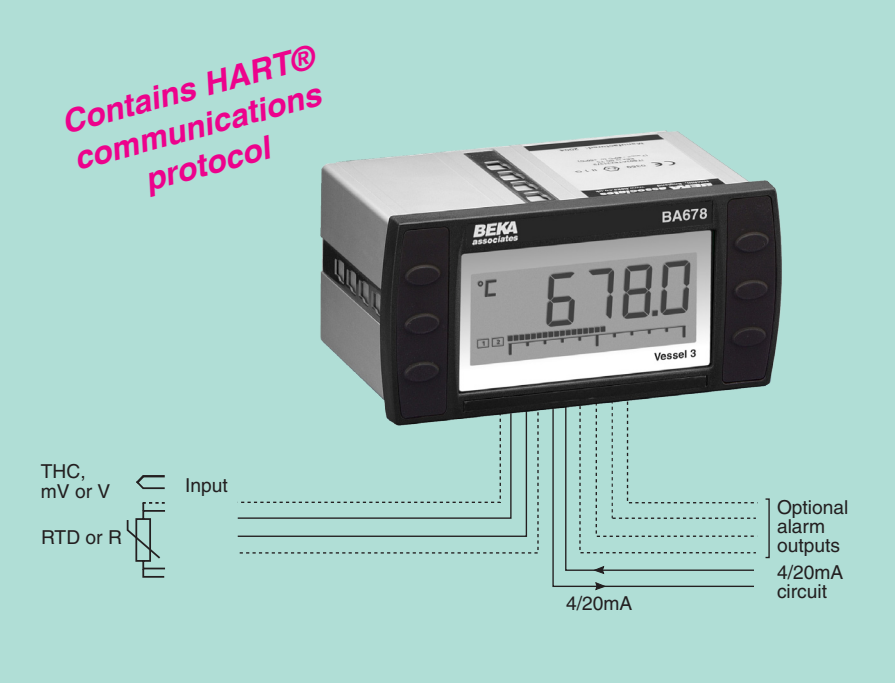
Accessories	**Please specify if required**
Display backlight	Backlight
Dual alarms	Alarms
External push buttons	External push buttons
Scale legend	Legend
Stainless legend plate	Legend
Pipe mounting kit	BA392D or BA393

* *If calibration information is not supplied, instrument will be conditioned for 3 wire Pt100 RTD input with a 4 to 20mA output corresponding to a display of 0.0 to 100.0°C.*

BA678C

Indicating temperature transmitter

General purpose



- **Large display with bargraph.**
- **4/20mA loop powered**
- **HART® communication & sensor diagnostics.**
- **RTD, THC, voltage or resistance input.**
- **Galvanically isolated sensor input.**
- **144 x 72mm DIN enclosure with IP66 front.**
- **Optional:**
  - **Loop powered backlight**
  - **Dual alarm**
- **3 year guarantee**

www.beka.co.uk/ba678c

The new BA678C is a second generation panel mounting, loop powered indicating temperature transmitter which replaces the BA578C. It provides an accurate local digital temperature display, plus a 4/20mA output, which may be scaled to represent any temperature range. Although incorporating new facilities such as HART® digital communication, diagnostics and a robust enclosure with a IP66 front panel, the BA678C remains electrically compatible with the earlier model.

The main application of the BA678C is to display temperature in a process area and to transmit a linearised 4/20mA current to other instruments. The digital display may be in °C or °F with the units of measurement shown on the display. A separately programmable 31 segment bargraph provides an easy to read analogue indication of the process value and trend.

Calibration and conditioning may be performed via HART® communication or the front panel push buttons. All instrument functions and calibration, including the type of input, are configurable on-site thus reducing the instrument inventory. The transmitter will operate with three or four wire resistance thermometers and with most common types of thermocouple. Differential and average measurements can also be made. The BA678C accepts voltage and resistance inputs allowing pressure, weight or position tranducer outputs to be displayed in engineering units and transmitted as a 4/20mA current and HART® digital signal.

Input galvanic isolation eliminates errors caused by common mode voltages up to 250V, allowing accurate measurement from earthed thermocouples in electrically noisy environments. Isolation also allows the transmitter to accurately display the output from earthed bridges.

HART® digital communication provides the primary temperature measurement in a digital format plus diagnostic information indicating the health of the primary element and the transmitter. HART® communication also enables the BA678C to be configured and calibrated from a portable calibrator or from the system host. If HART® digital communication is not required, the BA678C will function as a traditional 4/20mA analogue loop powered indicating temperature transmitter.

Sensor diagnostics are continuously performed by the BA678C transmitter generally as recommended by NAMUR standard NE 107 and the results transmitted via the HART® communication link. Faults may also be indicated by outputting an under or over range current and flashing the transmitter display.

The front panel is a robust Noryl moulding containing an armoured glass window that provides IP66 protection. A neoprene gasket seals the joint between the BA678C and the mounting panel allowing the transmitter to be installed in areas that will be cleaned with a hose.

An optional loop powered backlight produces green background illumination enabling the display to be read at night and in poor lighting conditions. It does not require additional field wiring or a power supply, but the transmitter minimum operating voltage is increased.

Dual Alarms are available as an option. Each has a galvanically isolated, solid state, single pole output that may be independently conditioned as a high or low alarm with a normally open or closed output. Annunciators on the instrument display show the status of both alarms.

Degrees Centigrade or Fahrenheit may be shown on the instruments display when thermocouple or resistance thermometer inputs are selected. Other units of measurement and tag or applicational information can be economically marked onto the display escutcheon prior to despatch or after installation on-site.

If explosive atmospheres are present the intrinsically safe BA478C should be used, this has the same features as the BA678C but has been certified for use in gas hazardous areas.

BEKA associates

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Tel. (01462) 438301 Fax (01462) 453971
e-mail sales@beka.co.uk www.beka.co.uk

SPECIFICATION

Supply voltage

Without backlight	9 to 28V
With backlight	15.5 to 28V

Output

Operating range	3.8 to 20.5mA
Resistance	5MΩ min

Display

Type	Liquid crystal 20mm high -99999 to 99999 31 segment bargraph
Reading rate	2 per second
Resolution	
RTD & THC input	Selectable 0.1° or 1°
Voltage & resistance input	Fully selectable

Input

Galvanic isolation	500V
Resistance thermometer	
Pt100 or Pt1000	-200 to 850°C
Connection	3 or 4 wires, or differential
Excitation current	175µA
Resistance	Adjustable between 0 & 5kΩ
Min span	10Ω

Thermocouple

Type	Range °C
B	200 to 1820
E	-200 to 1000
J	-210 to 1200
K	-200 to 1372
N	-200 to 1300
R	-50 to 1768
S	-50 to 1768
T	-200 to 400

Voltage	Adjustable between ±1.9V
Minimum span	2mV

HART® communication HART Registered, compliant with HART protocol standard revision 7.

Diagnostics Generally as NAMUR NE 107. Output via HART® and under or over range output current.

Performance

Accuracy RTD input	±0.1°C
THC input	±10µV

Effect of temperature on display

	Voltage	THC	RTD
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

Zero drift	<20ppm/ °C
Span drift	<50ppm/ °C
Series mode ac rejection	<0.1% error for 150mV rms 50 or 60Hz.
Common mode ac rejection	<0.1% error for 250V 50 or 60Hz.

Environmental

Operating temp	-40 to 70°C
Storage temp	-40 to 85°C
Humidity	To 95%
Enclosure	
Front	IP66
Rear	IP20
EMC	Complies with EMC Directive 2014/30/EU

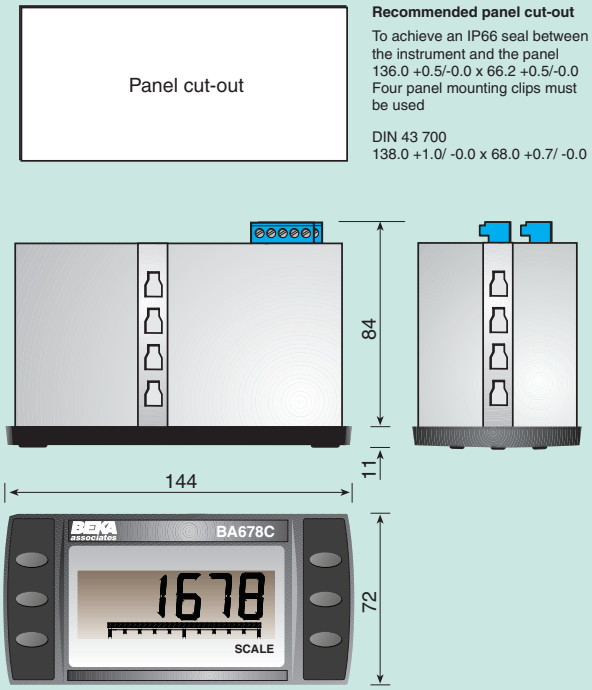
Mechanical

Terminals	Screw clamp for 0.5 to 1.5mm^2 cable.
Weight	0.7kg

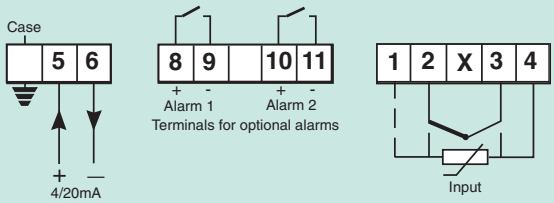
Accessories

Loop powered backlight	Green background illumination, increases operating voltage to 15.5V min.
Dual alarm	Isolated, solid state single pole
Ron	< 5Ω + 0.6V
Roff	>180k
Rating	30V dc; 100mA

DIMENSIONS (mm)



TERMINAL CONNECTIONS



X Do not use

Scale legend	Units marked onto display escutcheon. ~ *Note: For RTD & THC inputs, °C or °F is shown on the instrument display.*
Tag strip	Thermally printed legend on rear of instrument. ~

~ See accessory datasheet for details

HOW TO ORDER

	Please specify
Model number	BA678C
Input	RTD, THC & type; V or R*
CJ compensation	On or Off [THC input only]*
Display units	°C or °F* [RTD or THC inputs]
Display at which output is:	
4mA	XXXXX
20mA	XXXXX
Display at which bargraph:	
Starts	XXXXX
Finishes	XXXXX
Fault indication	Off; under range or over range

Accessories	**Please specify if required**
Display backlight	Backlight
Dual alarms	Alarms
Escutcheon marking	Legend *Note: For RTD & THC inputs °C or °F may be shown on the instrument* display.
Tag strip	Legend

** If calibration information is not supplied, instrument will be conditioned for 3 wire Pt100 RTD input with a 4 to 20mA output corresponding to a display of 0.0 to 100.0°C.*