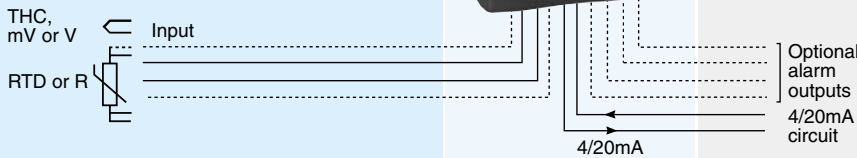


HART
COMMUNICATION PROTOCOL



Shown with optional loop powered display backlight

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 nL, 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.

BA474ND

Indicating temperature transmitter

Type n 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: Type n
 - Sensor input: Intrinsically safe
- ◆ 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



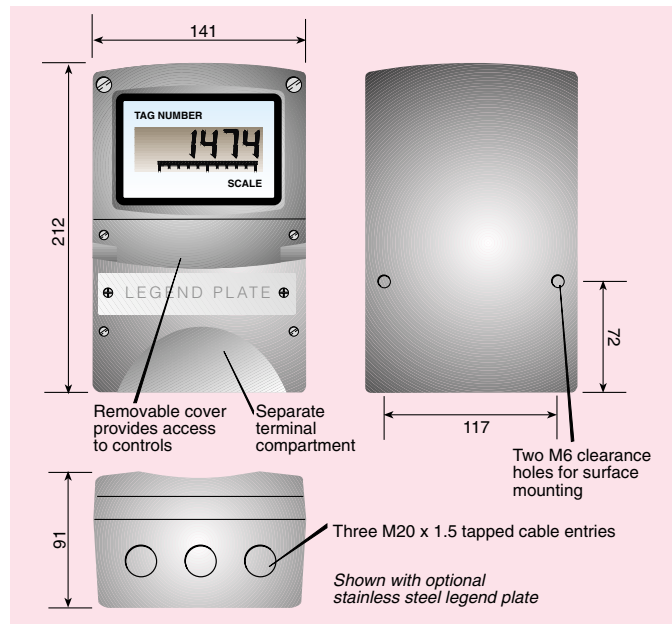
BEKA associates

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SPECIFICATION

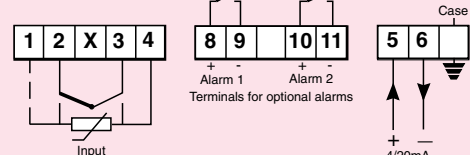
| | |
|--|---|
| Supply voltage | |
| Without backlight | 9 to 30V |
| With backlight | 15.5 to 30V |
| Output | |
| Operating range | 3.8 to 20.5mA |
| Resistance | 5MΩ min |
| Display | |
| Type | Liquid crystal 20mm high -99999 to 99999 31 segment bargraph |
| Reading rate | 2 per second |
| Input | |
| 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 EMC | IP66 (see ITS report C871V0383) In accordance with EU Directive 2004/1-8/EC |
| Mechanical | |
| Terminals | Screw clamp for 0.5 to 1.5mm² cable |
| Weight | 1.6kg |

DIMENSIONS (mm)



TERMINAL CONNECTIONS

X Do not use



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. ~ <i>Note: For RTD & THC inputs, °C or °F is shown on the instrument display.</i> |
| Stainless legend | Etched with tag number on front of instrument. ~ |
| Pipe mounting kit | BA392D or BA393. ~ |
| ~ See accessory datasheet for details | |

HOW TO ORDER

| | |
|-----------------------------|-----------------------------------|
| Model number | Please specify 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 |

* 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.