BA674D
Field mounting
indicating temperature
transmitter
Issue 11

TI 107

°C

140.8

FEED TEMPERATURE

CONTENTS

1. DESCRIPTION
The BA674D is a field mounting, 4/20mA loop powered temperature transmitter with a large easy to read display.   The instrument, which is HART® enabled, may be conditioned on-site to operate with most common thermocouples and resistance thermometers and will provide a linear 4/20mA output proportional to temperature, plus a digital temperature display. Voltage and resistance inputs may be scaled allowing the BA674D to display variables other than temperature such as position and weight.

Optional factory fitted alarms provide two galvanically isolated solid state outputs that may be independently configured for high or low operation.

For installation in poorly illuminated areas, an optional factory fitted loop powered display backlight is available.
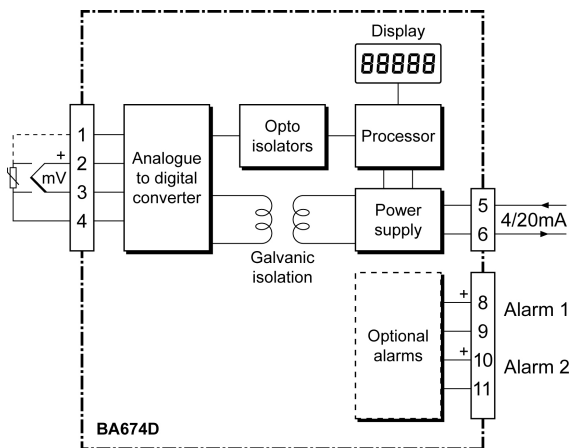

Fig 1 Simplified block diagram

2. DOCUMENTATION
This instruction manual describes the installation and configuration of the BA674D Indicating Temperature.

The transmitter is *HART Registered* and is compliant with HART protocol standard revision 7.   HART® commissioning information is included in the BA47X/67X Indicating Temperature Transmitter HART® Interface Guide which may be downloaded from www.beka.co.uk/manuals

3. OPERATION
Fig 1 shows a simplified diagram of the BA674D Indicating Temperature Transmitter.   The input, which may be from a resistance thermometer, thermocouple, or a dc voltage or resistance, is digitised and transferred to the instrument processor via an optical isolator.   The processor linearises the input signal, displays the resulting temperature in the selected units and controls the 4/20mA output current.

3.1 Controls
All functions of the transmitter may be configured via the four push buttons which are located behind the removable switch cover – see Fig 4. For applications where frequent adjustments are required the BA674D transmitter is available with an optional external membrane keypad.   Buttons respond within 0.5 seconds of being operated and unless continuously pushed the transmitter display will return to the operating mode after 2 seconds.

In the operational mode, i.e. when the transmitter is displaying the input signal, these push buttons have the following functions:

Button	Function
▼	While this button is operated the transmitter will show the display corresponding to 4mA output.
▲	While this button is operated the transmitter will show the display corresponding to 20mA output.
▼ + ▲	Transmitter displays output current in mA followed by output as % of the range.
P + ▼	Transmitter displays HART® short address followed by firmware version number.
P + E	Entry to configuration menu. See 6.1.1

When fitted with optional alarms

P + ▲	Entry to alarm set point menu. See 9.4.11
E + ▲	Transmitter displays alarm 1 setpoint
E + ▼	Transmitter displays alarm 2 setpoint
P	Activated alarm reverts to the non-alarm condition for the configured alarm silence time. See 9.4.10
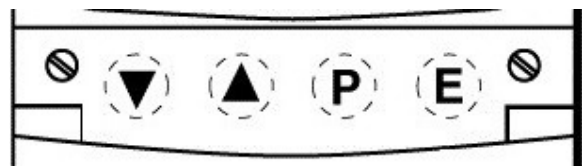
4. ELECTRICAL SYSTEM DESIGN

The BA674D is a smart HART® enabled loop powered 4/20mA Indicating Temperature Transmitter. The transmitter is available with an optional factory fitted loop powered display backlight that does not require additional field wiring or a separate supply but it does increases the transmitter's minimum operating voltage.

Operating voltage range between terminals 5 & 6:

> without backlight   9.0 to 28V
>
> with backlight   15.5 to 28V

When designing a transmitter loop it is necessary to establish that the sum of the voltage drops caused by the transmitter, the load and the cable resistance is less than the minimum supply voltage.

For the transmitter loop shown in Fig 2

> Minimum operating voltage of BA674D   9.0V
> without optional backlight.
>
> Maximum voltage drop caused by   5.0V
> 250Ω load.
> (250Ω x 20mA)
>
> Maximum voltage drop caused by   0.2V
> cable resistance.
> (10Ω x 20mA)
>
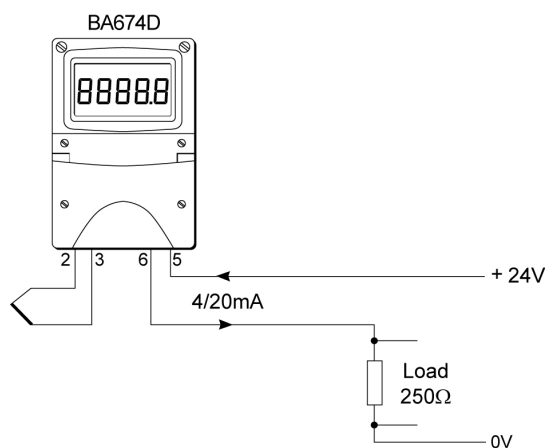> Total maximum voltage drop   14.2V

Fig 2 Typical BA674D temperature measuring loop

The power supply voltage must therefore be greater than 14.2V at all output currents.

4.1 Use as a temperature indicator

The BA674D may also be used as just a temperature indicator by ignoring the instrument's 4/20mA output current. The load shown in Fig 2 may be omitted and terminals 5 & 6 connected directly to the power supply.

5. INSTALLATION

5.1 Location

The BA674D Indicating Temperature Transmitter is housed in a robust IP66 glass reinforced polyester (GRP) enclosure incorporating an armoured glass window and stainless steel fittings. It is suitable for exterior mounting in most industrial environments, including offshore and wastewater treatment installations at ambient temperatures between –20º and +70ºC. Please consult BEKA associates if high vibration is anticipated.

The BA674D enclosure is surface mounting. Accessory kits described in section 9 of this manual enable the instrument to be mounted onto a vertical or horizontal pipe.

The field terminals and the two mounting holes are located in a separate compartment with a sealed cover allowing the instrument to be installed without exposing the display assembly.

The BA674D earth terminal is connected to the carbon loaded GRP enclosure. If this enclosure is not bolted to an earthed post or structure, the earth terminal should be connected to a local earth.

The BA674D enclosure is supplied with a bonding plate to ensure electrical continuity between the three conduit / cable entries.

The BA674D liquid crystal display has maximum contrast when viewed from directly ahead and slightly below the centre line of the instrument. Without a backlight there is very little degradation of contrast when viewed from above the centre line, but slight degradation may be noticeable when the instrument is fitted with a backlight.

5.2 Installation Procedure

Fig 3 illustrates the instrument installation procedure.

a. Remove the instrument terminal cover by unscrewing the two captive 'A' screws.

b. Mount the instrument on a flat surface and secure with two M6 screws through the 'B' holes. Alternatively use one of the mounting kits described in section 9.3

c. Remove the temporary hole plug and install an appropriate IP rated cable gland or conduit fitting. If more than one entry is required, one or both of the IP66 stopping plugs may be replaced with an appropriate IP rated cable gland or conduit fitting.

Cable glands, conduit fittings, blanking plugs and cables must be suitable for continuous use at the maximum operating temperature.

d. Connect the field wiring to the terminals as shown in Fig 4.

e. Replace the instrument terminal cover and evenly tighten the two 'A' screws.
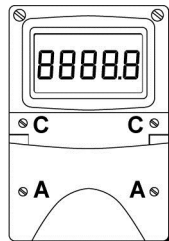
Step a
Remove the terminal cover by unscrewing the two 'A' screws.
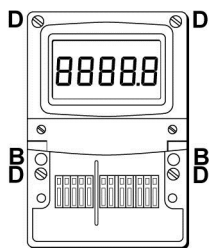
Step b
Secure the instrument to a flat surface with M6 screws through the two 'B' holes. Alternatively use a pipe mounting kit.
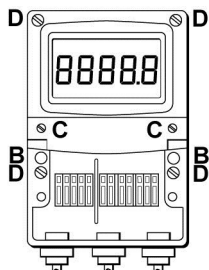
Step c, d and e
Remove the temporary hole plug and install an appropriate IP rated cable gland or conduit fitting. If more than one entry is required, one or both of the IP66 stopping plugs may be replaced by an appropriate IP rated cable gland or conduit fitting.

Fig 3   BA674D installation procedure

Two M6 clearance holes for surface mounting

141

212

72

117

Separate terminal compartment

Push buttons located behind removable cover

91

Three M20 x 1.5 tapped cable entries.
Supplied with two IP66 stopping plugs and one temporary hole plug.

1 2 X 3 4   8 9 10 11 5 6 E   Case

+ Alarm1   + Alarm2

Input

Terminals for optional alarms   + 4/20mA

1 2 X 3 4   1 2 X 3 4   1 2 X 3 4   1 2 X 3 4

+

THC or voltage

3 wire RTD or resistance

4 wire RTD or resistance

Differential RTD or resistance

X   *Do not use this terminal*

Fig 4 Dimensions and terminal connections

5.3 EMC

The BA674D complies with the requirements of the European EMC Directive 2014/30/EU and UK Electromagnetic Compatibility Regulations UKSI 2016:1091 (as amended). For specified immunity, all wiring should be in screened twisted pairs with the screens earthed at one point.

6. CONFIGURATION

The BA674D Indicating Temperature Transmitter may be configured and calibrated via HART® digital communication, or configuration may be performed using the menu accessed via the four push buttons located behind the instrument switch cover, see Fig 4. When frequent adjustments are required the transmitter can be supplied with a keypad mounted on the outside of this cover.

Configuration and calibration via HART® may be performed using a portable configurator connected to the BA674D test pillars located by terminals 5 & 6. Alternatively, proprietary configuration software installed on a personal computer may be used. In addition to the configuration functions available via the transmitter push buttons, HART® communication enables loop calibration and custom linearisation to be performed. See the BA47X/67X Indicating Temperature Transmitter HART® Interface Guide which may be downloaded from www.beka.co.uk/manuals

6.1 Configuration menu

Throughout this manual the four BA674D push buttons are identified **P E ▼ ▲** and legends displayed by the transmitter are shown within inverted commas e.g. 'CAL' and 'dEG'. Section 6.1.2 contains a summary of each configuration function including a cross reference to a more detailed description.
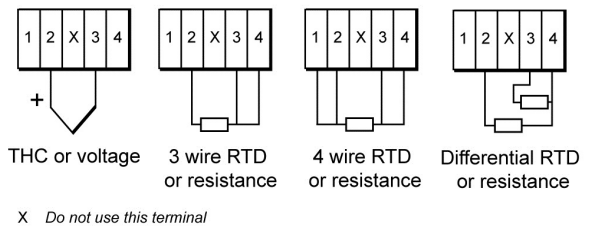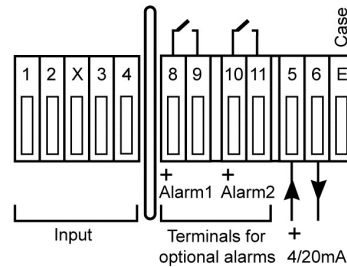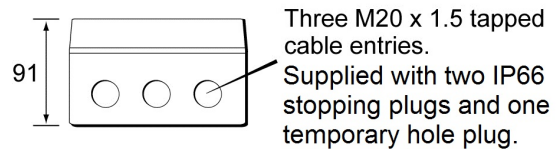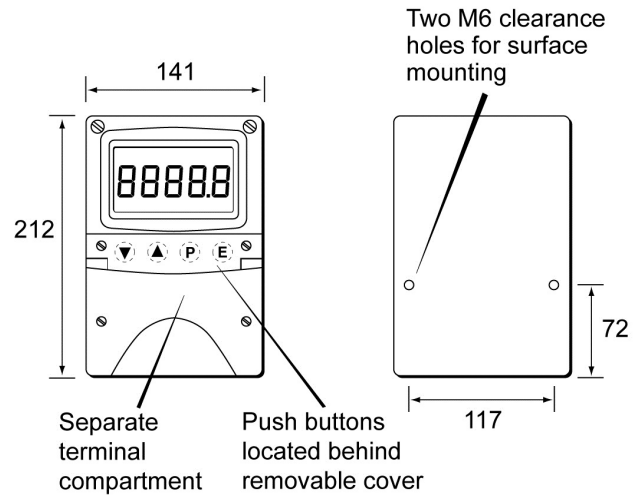
The functions contained in the configuration menu vary depending upon the transmitter input selected, see Figs 5, 6 & 7.

When the transmitter is being configured, the transmitter 4/20mA output current is locked at the value prior to entering the configuration menu.

When the optional alarms are fitted additional functions are added to the configuration menu which are described in section 9.4.

6.1.1 Access

Access to the configuration menu is obtained by operating the **P** and **E** buttons simultaneously. If the transmitter is not protected by an access code the first parameter 'InPut' will be displayed. If the transmitter is protected by an access code, 'CodE' will be displayed first. Pressing **P** will allow the four digit security code to be entered digit by digit using the ▼ or ▲ button to adjust the flashing digit and **P** to move control to the next digit. When the correct code has been entered, pressing **E** will cause the first parameter 'InPut' to be displayed. If an incorrect code is entered, or no button is pressed for ten seconds, the transmitter will automatically return to the operating mode. If the transmitter displays 'LoC' when the **P** and **E** buttons are operated simultaneously, the transmitter push buttons have

been locked by a HART® command – see BA47X/67X Indicating Temperature Transmitter HART® Interface Guide which may be downloaded from www.beka.co.uk/manuals.

6.1.2 Summary of functions

The functions that may be configured vary depending upon the input selected.

Thermocouple and RTD inputs

The BA674D will always display sensor temperature.

Configuration allows:

Digital display units and resolution to be selected.

Bargraph display to represent required part of the digital displayed range.

4/20mA output current to have required input range.

Voltage and resistance inputs

The BA674D can display the voltage or resistance input in any engineering units.

Configuration allows:

Zero and span of digital display to be adjusted.

Bargraph display to represent required part of the digital displayed range.

4/20mA output current to have required input range.

Each of the functions in the configuration menu is summarised below, including a cross-reference to a more detailed description.

Transmitter display	Summary of function
'InPut'	**Transmitter input**

Selects **o**ne of the following inputs:

Thermocouple	'tHC'
3 wire RTD	'3rtd'
4 wire RTD	'4rtd'
Differential RTD	'd_rtd'
Voltage	'Volt'
3 wire resistance	'3rES'
4 wire resistance	'4rES'

See section 6.2.1

The content of the configuration menu depends upon which transmitter input is selected, see following summary and Figs 5, 6 and 7.

For Thermocouple Input – see Fig 5

Transmitter display	Summary of function

't.tYPE' Thermocouple type
Selects 1 of 8 common types of thermocouple.
See section 6.2.2

'dEG' Units of digital display
Selects 1 of 4 units of temperature.
See section 6.2.3

'rESn' Display resolution
Selects low or high display resolution.
See section 6.2.4

'CJC' Cold junction compensation
Turns thermocouple cold junction compensation on or off.
See section 6.2.5

'FAuLt' Sensor fault analogue indication
Selects 1 of 3 under/over range output currents to indicate that a sensor fault has been detected. Sensor fault analogue indication may be disabled.
See section 6.2.6

'CAL' Configuration of 4/20mA output
Defines input at which transmitter output is 4 & 20mA.
See section 6.2.7

'bAr' Configuration of bargraph display
Defines transmitter digital display at which bargraph is zero and full scale.
See section 6.2.8

'CodE' Access code for configuration menu
Enters four digit configuration menu access code. Default code 0000 disables this function.
See section 6.2.9

For Resistance Thermometer (RTD) Input see Fig 6

Transmitter display	Summary of function

'r.tYPE' Resistance thermometer type
Selects Pt100 or Pt1000 sensor
See section 6.2.10

'dEG' Units of digital display
Selects 1 of 4 units of temperature.
See section 6.2.3

'rESn' Display resolution
Selects low or high display resolution.
See section 6.2.4

Transmitter display	Summary of function

'FAuLt' Sensor fault analogue indication
Selects 1 of 3 under/over range output currents to indicate that a sensor fault has been detected. Sensor fault analogue indication may be disabled.
See section 6.2.6

'CAL' Configuration of 4/20mA output
Defines transmitter input at which transmitter output is 4 & 20mA.
See section 6.2.7

'bAr' Configuration of bargraph display
Defines digital display at which bargraph is zero and full scale.
See section 6.2.8

'CodE' Access code for configuration menu
Enters four digit configuration menu access code. Default code 0000 disables this function.
See section 6.2.9

For Voltage and Resistance Inputs – see Fig 7

Transmitter display	Summary of function

'dP' Decimal point position
Defines position of displayed decimal point.
See section 6.2.11

'in-Lo' Lower input and display
Defines lower voltage or resistance input 'inVAL' and corresponding digital display 'diSP'.
See section 6.2.12

'in-Hi' Higher input and display
Defines higher voltage or resistance input 'inVAL' and corresponding digital display 'diSP'.
See section 6.2.13

'CAL' Configuration of 4/20mA output
Defines the transmitter input at which transmitter output is 4 & 20mA.
See section 6.2.7

'bAr' Configuration of bargraph display
Defines digital display at which bargraph is zero and full scale.
See section 6.2.8

'CodE' Access code for configuration menu
Enters four digit configuration menu access code. Default code 0000 disables this function. See section 6.2.9

6.2 Description of configuration menu functions

This section contains a detailed description of each function in the configuration menu. It should be read in conjunction with Figs 5, 6 & 7.

6.2.1 Transmitter input   'InPut'

This function enables the BA674D indicating temperature transmitter to be conditioned to operate with a thermocouple, 3 or 4 wire resistance thermometer, voltage or 3 or 4 wire resistance input. A differential resistance thermometer input may also be selected.   A differential thermocouple input is achieved by selecting the thermocouple input in this function and turning the cold junction compensation off in the CJC function – see 6.2.5.

Sensor	Transmitter display
Thermocouple	'tHC'
3 wire RTD	'3rtd'
4 wire RTD	'4rtd'
Differential RTD	'd_rtd'
Voltage	'VoLt'
3 wire resistance	'3rES'
4 wire resistance	'4rES'

The 'InPut' function is the first function displayed when entering the configuration menu, or it may be selected from within the menu by operating the ▼ or ▲ button.   To enter the function press **P** which will reveal the existing setting which may be changed using the ▼ or ▲ button. When the required input has been selected press **E** to enter the selection and return to the 'InPut' prompt in the configuration menu.

6.2.2 Thermocouple type   't.tYPE'

This function enables one of eight common thermocouples to be selected. The following table shows the thermocouple types, indicator display and the operating temperature range.

THC Type	BA674D Display	Temperature range °C		
B	'b'	200	to	1820
E	'E'	-200	to	1000
J	'J'	-210	to	1200
K	'H'	-200	to	1372
N	'n'	-200	to	1300
R	'r'	-50	to	1768
S	'S'	-50	to	1768
T	't'	-200	to	400

The 't.tYPE' function may be selected from within the menu by operating the ▼ or ▲ button.   To enter the function press **P** which will reveal the existing setting which may be changed using the ▼ or ▲ button. When the required thermocouple has been selected, press **E** to enter the selection and return to the 't.tYPE' prompt in the configuration menu.

6.2.3 Units of digital display   'dEG'

The transmitter digital display may be in one of four units of temperature.

Units	Transmitter Display
°C	°C
°F	°F
r	r
K	H

When °C or °F are selected the units of measurement are shown at the top left hand corner of the display when the transmitter is in the operating mode.

The 'dEG' function may be selected from within the menu by operating the ▼ or ▲ button.   To enter the function press **P** which will reveal the existing setting which may be changed using the ▼ or ▲ button. When the required units have been selected, press **E** to enter the selection and return to the 'dEG' prompt in the configuration menu.

6.2.4 Display resolution   'rESn'

This function defines the resolution of the transmitter display but does not affect the resolution of the 4/20mA output current.

Resolution	Transmitter Display
Lo	0 0 0 0 0
hi	0 0 0 0.0

The 'rESn' function may be selected from within the menu by operating the ▼ or ▲ button.   To enter the function press **P** which will reveal the existing setting which may be changed using the ▼ or ▲ button. When the required resolution has been selected, press **E** to enter the selection and return to the 'rESn' prompt in the configuration menu.

6.2.5 Cold junction compensation   'CJC'

The temperature of the thermocouple cold junction, which is the transmitter input terminals, is measured and added to the thermocouple output so that the transmitter displays and transmits the hot junction temperature. If cold junction compensation is not required e.g. for differential measurements with two thermocouples, this function allows it to be turned off. The 'CJC' function may be selected from within the configuration menu by operating the ▼ or ▲ button. To enter the function press **P** which will reveal the existing setting which may be changed using the ▼ or ▲ button. When set as required, press **E** to enter the selection and return to the 'CJC' prompt in the configuration menu.

6.2.6 Sensor fault analogue indication 'FAuLt'

The sensor fault analogue indication function appears in the menu when the transmitter is configured for a resistance thermometer or a thermocouple input.

When a fault is detected the transmitter's 4/20mA output current is set to the specified under or over range fault value and the transmitter's digital display flashes as shown below. One of three fault currents may be selected, or the fault indication may be turned off. Irrespective of how the function is set the transmitter display will flash when a sensor fault is detected.

Selected fault current	Output current	Transmitter display
'oFF'	No fault indication	Flashes
'dn3.6'	3.6mA *	Flashes
'dn3.8'	3.8mA	Flashes
'uP 21'	21.0mA	Flashes

* Not recommended when HART® communication is used.

The 'FAuLt' function may be selected from within the configuration menu by operating the ▼ or ▲ button. To enter the function press *P* which will reveal the existing setting which may be changed using the ▼ or ▲ button. When set as required, press *E* to enter the selection and return to the 'FAuLT' prompt in the configuration menu.

The typical detection thresholds and approximate response times are:

Thermocouple	> 5kΩ	10 sec
RTD sensor	< 5Ω >500Ω	1 sec
RTD sense leads	> 50Ω	10 sec

In the time between a fault developing in an RTD sense lead or a thermocouple and the fault being detected, the transmitter output and display may drift from the last correct measured value.

6.2.7 Configuration of 4/20mA output 'CAL'

This function defines the relationship between the transmitter input and the 4/20mA output current. 'Zero' defines the transmitter input at which the output is 4mA and 'Span' defines the input at which the output is 20mA.

This function does not affect the transmitter display which is fixed for thermocouple and resistance thermometer inputs and adjusted via the 'in-Lo and 'in-Hi' functions for resistance and voltage inputs.

The 'CAL' function may be selected from within the menu by operating the ▼ or ▲ button. To enter the function press *P* which will display the 'ZEro' function

in the sub-menu, pressing *P* again will reveal the existing transmitter input at which the transmitter output current is 4mA. Input is shown in units which depend upon how the transmitter input 'InPut' and display 'dEG' have been configured, as shown below:

Configured transmitter input	Input shown as
Thermocouple	°C, °F, K or r
Resistance thermometer	°C, °F, K or r
Voltage	mV
Resistance	Ohms

The input, at which the transmitter output current is 4mA, may be changed using the ▼ or ▲ button to adjust the flashing digit and the *P* button to move control to the next digit. When the required input has been selected, press *E* to enter the selection and return to the 'ZEro' prompt in the sub menu.

The 'SPAn' function, which defines the input at which the transmitter current output is 20mA, may be selected from within the sub-menu by operating either the ▼ or ▲ button. To enter the function press *P* which will reveal the existing transmitter input at which the transmitter output current is 20mA. Again the input will be shown in units which depend upon how the transmitter has been configured and may be changed using the ▼ or ▲ button to adjust the flashing digit and the *P* button to move control to the next digit. When the required input has been selected, press *E* to enter the selection and return to the 'SPAn' prompt.

Note: When configured for a voltage input, operating the *P* button when the 0.1mV digit is flashing in the 'Zero' or 'SPAn' sub-menus increases the input resolution to 0.01mV which is indicated by the display colon being activated. When the required input has been selected, pressing *E* enters the selection and returns the transmitter to the 'ZEro' or 'SPAn' prompt in the sub-menu.

If, when configured for a voltage or resistance input the displayed decimal point has been set to autorange, it may be necessary to manually position the decimal point before adjusting 'ZEro' or 'SPAn'. This can be achieved by repeatedly operating the *P* button until the activated decimal point flashes, the decimal point can then be positioned using either the ▼ or ▲ button. Pressing the *P* button again will return control to one of the digits.

6.2.8 Configuration of bargraph display 'bAr'

This function contains three sub-functions that justify the bargraph display and define the relationship between the bargraph and the transmitter digital display.

Sub-function 'b.tYPE' enables the bargraph to be left, centre or right justified, or to be turned off. Sub-functions 'bArLo' and 'bArHi' define the transmitter digital display at which the bargraph starts and is at full scale.

The 'bAr' function may be selected from within the configuration menu by operating the ▼ or ▲ button. To enter the function press **P** which will display the 'b.tYPE' sub-function, pressing **P** again will reveal the existing bargraph justification. The ▼ or ▲ button will scroll through the four options, when the required justification is displayed, pressing **E** will enter the selection and return the display to the 'b.tYPE' prompt in the sub-menu from which 'bArLo' may be selected using the ▼ or ▲ button.

'bArLo' defines the transmitter digital display at which the bargraph starts, to enter the function press **P** which will reveal the existing setting. The display may be changed using the ▼ or ▲ button to adjust the flashing digit and the **P** button to move control to the next digit. When the required starting display has been selected, press **E** to return to the 'bArLo' prompt in the sub-menu from which the 'bArHi' function may be selected.

'bArHi' defines the transmitter digital display at which the bargraph is full scale, to enter the function press **P** which will reveal the existing setting. The display may be changed using the ▼ or ▲ button to adjust the flashing digit and the **P** button to move control to the next digit. When the required display has been selected, press **E** twice to return to enter the new values and return to the 'bAr' prompt in the configuration menu.

Note: If, when configured for a voltage or resistance input the displayed decimal point has been set to autorange, it may be necessary to manually position the decimal point before adjusting 'bArLo' or 'bArHi'. This can be achieved by repeatedly operating the **P** button until the activated decimal point flashes, the decimal point can then be positioned using either the ▼ or ▲ button. Pressing the **P** button again will return control to one of the digits.

6.2.9 Access code for configuration menu 'CodE'

Access to the configuration menu may be protected by a four digit security code which must be entered to gain access. New instruments are supplied configured with the default code 0000 which allows unrestricted access to the menu.

To enter a new access code select 'CodE' in the configuration menu by operating the ▼ or ▲ button. To enter the function press **P** which will reveal the current access code with one digit flashing. The code may be changed using the ▼ or ▲ button to adjust the flashing digit and the **P** button to move control to the next digit. When the required code has been selected, press **E** to enter the selection and return to the 'CodE' prompt in the configuration menu. The revised access code will be activated when the transmitter is returned to the operating mode.

If the access code is lost please contact BEKA associates.

6.2.10 Resistance thermometer type 'r.tYPE'

This function configures the BA674D to operate with a Pt100 or Pt1000 resistance thermometer input.

The 'r.tYPE' function may be selected from within the configuration menu by operating the ▼ or ▲ button. To enter the function press **P** which will reveal the existing setting which may be changed using the ▼ or ▲ button.

Resistance thermometer	Transmitter display
Pt100	100r
Pt1000	1000r

When the required resistance thermometer has been selected, press **E** to enter the selection and return to the 'r.tYPE' prompt in the configuration menu.

6.2.11 Decimal point position 'dP'

This function defines the position of the decimal point in the operating mode when the transmitter is configured for a voltage or a resistance input.

This function does not appear in the configuration menu when the transmitter is configured for a thermocouple or a resistance thermometer input.

The 'dP' function may be selected from within the menu by operating the ▼ or ▲ button. To enter the function press **P** to reveal the existing position of the decimal point which may be moved to the required fixed position, omitted, or set to autorange by operating the ▼ or ▲ button. Autorange, which is selected when all the decimal points are activated, ensures that the transmitter numeric display is always shown with maximum resolution irrespective of the value. When set as required, press **E** to enter the selection and return to the 'dP' prompt in the configuration menu.

6.2.12 Lower input & display   'in-Lo'

This function, which only appears in the menu when the transmitter is configured for a voltage or resistance input, defines the transmitter lower input voltage or resistance 'inVAL' and the corresponding transmitter digital display 'diSP'.

This function does not affect the transmitter output current which is defined by the 'CAL' function.

The 'in-Lo' function may be selected from within the configuration menu by operating the ▼ or ▲ button. To enter the function press *P* which will display 'inVAL' in the sub-menu, pressing *P* again will reveal the existing transmitter lower input voltage or resistance.   'InVAL' is shown in units that depend upon how the transmitter input 'inPut' has been configured, as shown below:

Configured transmitter input	'inVAL' units	resolution
Voltage	mV	0.1 or 0.01mV
Resistance	Ω	0.1Ω

'inVAL' may be adjusted using the ▼ or ▲ button to adjust the flashing digit and the *P* button to move control to the next digit.   When configured for a voltage input, operating the *P* button when the 0.1mV digit is flashing increases the resolution to 0.01mV which is indicated by the display colon being activated.   When the required input has been selected, press *E* to enter the selection and return to the 'inVAL' prompt in the sub-menu.

'diSP' which is the transmitter display corresponding to 'inVAL' may be selected from within the sub-menu by operating either the ▼ or ▲ button. To enter the function press *P* which will reveal the existing lower transmitter display.   The display may be changed using the ▼ and ▲ buttons to adjust the flashing digit and the *P* button to move control to the next digit. When the required transmitter display has been selected, press *E* twice to enter the selection and return to the configuration menu.

Note: When the displayed decimal point has been set to autorange, it may be necessary to manually position the decimal point before adjusting 'inVAL'. This can be achieved by repeatedly operating the *P* button until the activated decimal point flashes, the decimal point can then be positioned using either the ▼ or ▲ button.   Pressing the *P* button again will return control to one of the digits.

6.2.13 Higher input & display   'in-Hi'

This function which only appears in the menu when the transmitter is configured for a voltage or resistance input, defines the transmitter higher input voltage or resistance 'inVAL' and the corresponding transmitter digital display 'diSP'.

This function does not affect the transmitter output current which is defined by the 'CAL' function.

The 'in-Hi' function may be selected from within the configuration menu by operating the ▼ or ▲ button. To enter the function press *P* which will display 'inVAL' in the sub-menu, pressing *P* again will reveal the existing transmitter higher input voltage or resistance.   'InVAL' is shown in units which depend upon how the transmitter input 'inPut' has been configured, as shown below:

Configured transmitter input	'inVAL' units	resolution
Voltage	mV	0.1 or 0.01mV
Resistance	Ω	0.1Ω

'inVAL' may be adjusted using the ▼ or ▲ button to adjust the flashing digit and the *P* button to move control to the next digit.   When configured for a voltage input, operating the *P* button when the 0.1mV digit is flashing increases the resolution to 0.01V which is indicated by the display colon being activated.   When the required input has been selected, press *E* to enter the selection and return to the 'inVAL' prompt in the sub-menu.

'diSP' which is the transmitter display corresponding to 'inVAL' may be selected from within the sub-menu by operating either the ▼ or ▲ button. To enter the function press *P* which will reveal the existing higher transmitter display.   The display may be changed using the ▼ or ▲ button to adjust the flashing digit and the *P* button to move control to the next digit. When the required transmitter display has been selected, press *E* twice to enter the selection and return to the configuration menu.

Note: When the displayed decimal point has been set to autorange, it may be necessary to manually position the decimal point before adjusting 'inVAL'. This can be achieved by repeatedly operating the *P* button until the activated decimal point flashes, the decimal point can then be positioned using either the ▼ or ▲ button.   Pressing the *P* button again will return control to one of the digits.

Fig 5 Thermocouple input configuration menu

Operating mode

88888

CodE

XXXX

Enter security code
▲ or ▼ and
P to move to next digit

InPut — tHC
Type of input
▲ or ▼
to select thermocouple input

t.tYPE — E
Sensor type
▲ or ▼
to select type of thermocouple

dEG — °C
Units of display
▲ or ▼
to select units of display

rESn — Lo
Resolution
▲ or ▼
to toggle between Lo and Hi

CJC — on
Cold junction compensation
▲ or ▼
to toggle between on and oFF

FAuLt — uP 21
Sensor fault detection
▲ or ▼
to select required fault indication

CAL
ZEro — 88888
Define input at which current output is 4mA
Enter by pressing
▲ or ▼ and
P to move to next digit

SPAn — 88888
Define input at which current output is 20mA
Enter by pressing
▲ or ▼ and
P to move to next digit

Calibration of 4/20mA output current

bAr
b.tYPE — LEFt
Select bargraph justification
▲ or ▼
to select bargraph justification

bArLo — 88888
Define display at which bargraph is zero
Enter by pressing
▲ or ▼ and
P to move to next digit

bArHi — 88888
Define display at which bargraph is full scale
Enter by pressing
▲ or ▼ and
P to move to next digit

Calibration of bargraph

CodE — XXXX
Define security code for access to configuration menu
Enter by pressing
▲ or ▼ and
P to move to next digit

13

Operating mode

88888 — CodE — XXXX — InPut

InPut — 3rtd
Type of input
◄ or ► to select required resistance thermometer input

r.tYPE — 100r
Sensor type
◄ or ► to select type of resistance thermometer

dEG — °C
Units of display
◄ or ► to select units of display

rESn — Lo
Resolution
◄ or ► to toggle between Lo and Hi

FAuLt — uP 21
Sensor fault detection
◄ or ► to select required fault indication

CAL
ZEro — 88888
Define input at which current output is 4mA
Enter by pressing ◄ or ► and P to move to next digit

SPAn — 88888
Define input at which current output is 20mA
Enter by pressing ◄ or ► and P to move to next digit

Calibration of 4/20mA output current

bAr
b.tYPE — LEFt
Select bargraph justification
◄ or ► to select bargraph justification

bArLo — 88888
Define display at which bargraph is zero
Enter by pressing ◄ or ► and P to move to next digit

bArHi — 88888
Define display at which bargraph is full scale
Enter by pressing ◄ or ► and P to move to next digit

Calibration of bargraph

CodE — XXXX
Define security code for access to configuration menu
Enter by pressing ◄ or ► and P to move to next digit

Fig 6 Resistance thermometer input configuration menu

Fig 7   Voltage and resistance input configuration menu

Operating mode

88888

CodE

XXXX

InPut

VoLt

Enter security code
Enter by pressing ▲ or ▼ and P to move to next digit

Type of input
▲ or ▼ to select required input

dP

00000

Decimal point position
▲ or ▼ to select position of decimal point

in-Lo

inVAL

88888

diSP

88888

Define lower input
Enter by pressing ▲ or ▼ and P to move to next digit

Define display at lower input
Enter by pressing ▲ or ▼ and P to move to next digit

Calibration of input and corresponding digital display

in-Hi

inVAL

88888

diSP

88888

Define higher input
Enter by pressing ▲ or ▼ and P to move to next digit

Define display at higher input
Enter by pressing ▲ or ▼ and P to move to next digit

CAL

ZEro

88888

SPAn

88888

Define input at which current output is 4mA
Enter by pressing ▲ or ▼ and P to move to next digit

Define input at which current output is 20mA
Enter by pressing ▲ or ▼ and P to move to next digit

Calibration of 4/20mA output current

bAr

b.tYPE

LEFt

bArLo

88888

bArHi

88888

Select bargraph justification
▲ or ▼ to select bargraph justification

Define display at which bargraph is zero
Enter by pressing ▲ or ▼ and P to move to next digit

Define display at which bargraph is full scale
Enter by pressing ▲ or ▼ and P to move to next digit

Calibration of bargraph

CodE

XXXX

Define security code for access to configuration menu
Enter by pressing ▲ or ▼ and P to move to next digit

6.3 Default configuration

If the transmitter's configuration is not specified at the time of ordering, the instrument will be configured as follows but can easily be reconfigured on-site.

Function	Factory default
Transmitter input 'InPut'	3 wire RTD
Sensor type 't.tYPE'	Pt100
Units of digital display 'dEG'	ºC
Display resolution 'rESn'	Low
Sensor fault 'FAuLt'	Off
4/20mA output 'CAL'	0.0 to 100.0
Bargraph display 'bAr'	Left hand justification. Bargraph starts at digital display 0.0 and finishes at digital display 100.0
Access code 'CodE'	0000 which disables this function.

7. CONFIGURATION EXAMPLE

In this example a BA674D indicating temperature transmitter is required to display temperature in degrees Celsius with maximum resolution. The temperature sensor is a 3 wire Pt100 resistance thermometer and the 4/20mA transmitter output is required to representing –10 to +250°C. . A left hand justified bargraph representing 100.0 to 200.0°C is required. Resistance thermometer failure is to be indicated by an overrange output current of 21.0mA. After configuration access to the configuration menu is to be protected by code 1209.

Configuration is performed using the four push buttons which are located behind the removable switch cover below the digital display – see Fig 4. The BA674D can be supplied with factory fitted external push buttons if frequent adjustments are required.

The transmitter configuration may also be performed via HART® communication from a local or remote configurator. The HART® communication protocol includes additional functions allowing the complete temperature loop, including the temperature sensor and the transmitter load, to be calibrated, see the BEKA HART® Interface Guide which may be downloaded from www.beka.co.uk/manuals

Step 1   **Access the configuration menu & select the type of input.**
See: Fig 6 and section 6.2.1
New BA674D indicating temperature transmitters are supplied conditioned with default access code '0000' that allows unrestricted access to the configuration menu.

To enter the configuration menu press buttons *P* and *E* simultaneously which will cause the first prompt 'InPut' to be displayed. Press *P* to enter the function and the transmitter will display the current type of input. To configure the transmitter to operate with a three wire resistance thermometer press the ▼ or ▲ button until '3rtd' is displayed. When selected press *E* to enter the selection and return to the 'InPut' prompt in the configuration menu.

Step 2   **Select resistance thermometer type**
See: Fig 6 and section 6.2.10
Using the ▼ or ▲ button select the 'r,tYPE' prompt from the configuration menu and press *P* to enter the function which enables the type of resistance thermometer to be selected. The transmitter will display the existing type of resistance thermometer, using the ▼ or ▲ button select '100r' which is the required Pt100 sensor. Enter the selection by pressing the *E* button that will return the display to the 'r.tYPE' prompt in the configuration menu.

Step 3   **Select units of digital display**
See: Fig 6 and section 6.2.3
Using the ▼ or ▲ button select 'dEG' from the configuration menu and press *P* to enter the function which enables the digital display units of measurement to be selected. Using the ▼ or ▲ button scroll through the options and select '°C' which represents degrees Celsius. Press *E* to enter the selection and return the transmitter display to the 'dEG' prompt in the configuration menu.

Step 4   **Select display resolution**
See: Fig 6 and section 6.2.4
Using the ▼ or ▲ button select 'rESn' from the configuration menu and press *P* to enter the function which determines the resolution of the digital display. Using the ▼ or ▲ button select 'hi' to provide the required 0.1 resolution display. Press *E* to enter this selection and return the display to the 'rESn' prompt in the configuration menu.

Step 5   **Sensor fault detection**
See: Fig 6 and section 6.2.6
Using the ▼ or ▲ button select 'FAuLt', the input sensor fault detection function, from the configuration menu and press *P*. Using the ▼ or ▲ button scroll through the options and select 'uP 21' which forces the output current to 21.0mA when a sensor failure is detected. Enter the selection by pressing *E* which will also return the transmitter display to the 'FAuLt' prompt in the configuration menu.

Step 6   **Configuration of 4/20mA output**
See: Fig 6 and section 6.2.7
The BA674D transmitter input at which the transmitter output current is 4mA and 20mA is defined by the 'CAL' function which contains two sub-functions.
Using the ▼ or ▲ button select 'CAL' from the configuration menu and press *P* which will show the 'ZEro' sub-function prompt. Press *P* again to enter this sub-function, which will reveal the existing input at which the transmitter output current is 4mA. Adjust the display to the required –0010.0 using the ▼ or ▲ button to adjust the flashing digit and the *P* button to move control to the next digit. A negative display is achieved by

scrolling the most significant digit below zero using the ▼ button. When set press **E** to enter the new value and return to the 'ZEro' sub-function prompt from which the 'SPAn' sub-function, which defines the display at which the output is 20mA, may be selected using the ▼ or ▲ button. Press **P** to enter this sub-function, which will reveal the existing input at which the transmitter output current is 20mA. Adjust the display to 0250.0 using the ▼ or ▲ button to adjust the flashing digit and the **P** button to move control to the next digit. Finally press **E** twice, first to enter the selection and return to the 'SPAn' sub-function prompt, and again to return to the 'CAL' function prompt in the configuration menu.

Step 7 **Configuration of bargraph display**
See: Fig 6 and section 6.2.8
This function contains three sub-functions that justify the bargraph display and define the transmitter digital display at which the bargraph starts and finishes.

Using the ▼ or ▲ button select 'bAr' from the configuration menu and press **P** which will show the 'b.tYPE' sub-function prompt. Press **P** again to enter this sub-function, which will reveal the existing bargraph justification. Using the ▼ or ▲ button scroll through the options and select 'LEFt' which will start the bargraph on the left hand side of the display. Press **E** to enter the selection and return to the 'b.tYPE' sub-function prompt from which, using the ▼ or ▲ button, the 'bArLo' sub-function may be selected. Press **P** to enter the 'bArLo' sub-function which will reveal the existing digital display at which the bargraph starts. Set the display to 0100.0 using the ▼ or ▲ button to adjust the flashing digit and the **P** button to move control to the next digit. When set, press **E** to enter the new value and return to the 'bArLo' sub-function prompt from which the 'bArHi' sub-function may be selected. Press **P** to enter the 'bArHi' sub-function which will reveal the existing digital display at which the bargraph finishes. Set the display to 0200.0 using the ▼ or ▲ button to adjust the flashing digit and the **P** button to move control to the next digit. Finally press **E** twice, first to enter the selection and return to the 'bArHi' sub-function prompt, and again to return to

the 'bAr' function prompt in the configuration menu.

Step 8 **Enter the configuration menu access code.**
See Fig 6 and section 6.2.9
This function defines the four digit code that must be entered to obtain access to the BA674D transmitter's configuration menu.
Using the ▼ or ▲ button select the 'CodE' prompt from the configuration menu and press **P** which, for a new instrument, will show the default code '0000' with the first digit flashing. Using the ▼ or ▲ button to adjust the flashing digit and the **P** button to transfer control to the next digit, set the display to 1209. Press **E** twice to enter the new access code and return the BA674D to the display mode via the 'CodE prompt.

This completes the instrument configuration. The BA674D transmitter will now function as specified at the beginning of this example. Access to the configuration is protected by code 1209 which must be entered each time a change is made.

8. MAINTENENCE

The BA674D indicating temperature transmitter should only be maintained by trained competent personnel.

8.1 Fault finding during commissioning

If a BA674D fails to function during commissioning the following procedure should be followed:

Symptom	Cause	Check
No display or output current	Incorrect wiring Low supply voltage	Wiring That voltage between terminals 5 & 6 is between 9 & 28V at all output currents. Terminal 5 positive. or between 15 .5 & 28V at all output currents if optional backlight is fitted.
Digital display is over or under range showing 9.9.9.9.9 or -9.9.9.9.9 with all decimal points flashing.	Incorrect wiring of THC or RTD input Input is outside specified range for voltage or resistance input.	Wiring and input configuration. Wiring and input configuration.
Bargraph is over or under range. with scale flashing, bargraph displaying all or just one segment.	Input is outside specified range for bargraph.	Reconfigure bargraph display.
Digital display & bargraph flashing and 4/20mA fixed at 3.6, 3.8 or 21.0mA	Sensor fault detection has been activated.	Sensor and input wiring.

8.2 Fault finding after commissioning

ENSURE PLANT SAFETY BEFORE STARTING MAINTENANCE

If a BA674D fails after it has been functioning correctly the following procedure should be followed:

Symptom	Cause	Check
No display or output current	Wiring or power supply fault.	Wiring That voltage between terminals 5 & 6 is between 9 & 28V. Terminal 5 positive. or 15 .5 & 28V if optional backlight is fitted.
Digital display & bargraph flashing and 4/20mA fixed at 3.6, 3.8 or 21.0mA	Sensor fault detection has been activated.	Sensor and input wiring.

If this procedure does not reveal the cause of the fault we recommend that the transmitter is replaced.

8.3 Servicing

We recommend that faulty BA674D indicating temperature transmitters are returned to BEKA associates or to our local agent for repair.

8.4 Routine maintenance

The mechanical and electrical condition of the transmitter should be regularly checked. Initially an annual inspection is recommended, but the inspection frequency should be adjusted to suit the environmental conditions.

8.5 Guarantee

Transmitters which fail within the guarantee period should be returned to BEKA associates or our local agent. It is helpful if a brief description of the fault symptoms is provided.

8.6 Customer comments

BEKA associates is always pleased to receive comments from customers about our products and services. All communications are acknowledged and whenever possible, suggestions are implemented.

9. ACCESSORIES

9.1 Scale and tag marking

BA674D indicating temperature transmitters are fitted with a blank escutcheon around the liquid crystal display. If specified when the transmitter is ordered, this can be supplied printed with units of measurement and tag information, plus a scale for the horizontal bargraph. Alternatively, information may be added on-site via an embossed strip, dry transfer or a permanent marker.

To gain access to the display escutcheon remove the terminal cover by unscrewing the two 'A' screws which will reveal two concealed 'D' screws. Unscrew all four 'D' screws and carefully lift off the front of the instrument.   The location of these screws is shown in Fig 3.

After adding the required legends, or fitting a new pre-printed self-adhesive escutcheon, ensure that the gasket is correctly positioned before reassembling the instrument enclosure.

9.2 Tag plate

The BA674D can be supplied with a blank or custom laser etched stainless steel plate secured by two screws to the front of the instrument enclosure. This plate can accommodate:

1 row of 9 alphanumeric characters 10mm high

or 1 row of 11 alphanumeric characters 7mm high

or 2 rows of 18 alphanumeric characters 5mm high

9.3 Pipe mounting kits

Two pipe mounting kits are available for securing the BA674D to a horizontal or vertical pipe.

BA392D   Stainless steel bracket secured by two worm drive hose clips for 60 to 80mm outside diameter pipes.

BA393   Heavy-duty stainless steel bracket secured by a single 'V' bolt. Will clamp to any pipe with an outside diameter between 40 and 80mm.

9.4 Alarms

The BA674D can be supplied with two solid state single pole alarm outputs that may be independently programmed as high or low alarms with normally open or normally closed outputs. Fig 8 illustrates the conditions available and shows which are fail safe, i.e. in the alarm condition the output is open.

WARNING
Alarms should not be used for critical safety applications such as a shut down system.
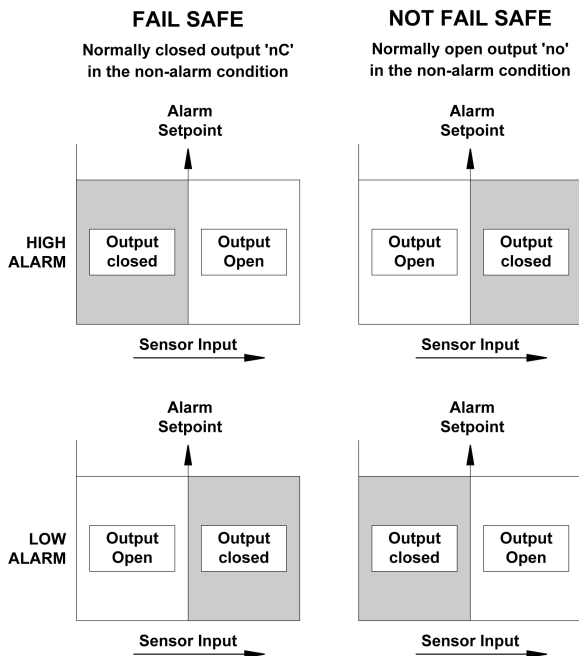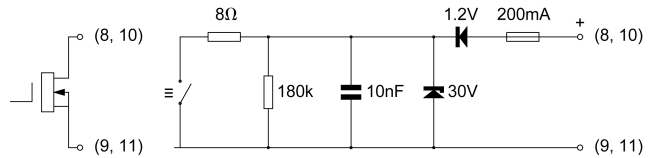

Fig 9 Equivalent circuit of each alarm output

The maximum rating of each alarm output is 30Vdc; 100mA.

WARNING
Connection of an alarm output to a supply greater than 30V may rupture the internal encapsulated fuse.

Fig 8 Alarm outputs

When an alarm is activated an annunciator appears on the left hand side of the BA674D display. This shows which alarm has been activated and will flash if the alarm is delayed or silenced.

Programmable functions for each alarm include adjustable setpoint, hysteresis, alarm delay and alarm accept.

9.4.1 Solid state output

Each alarm has a galvanically isolated single pole solid state switch output as shown in Fig 9. The outputs are polarised and current will only flow in one direction. Terminals 8 and 10 should be connected to the positive side of the supply.

Ron = 8 ohms + 1.2V
Roff = greater than 180k

Note: Because of the series protection diodes some test meters may not detect a closed alarm output.
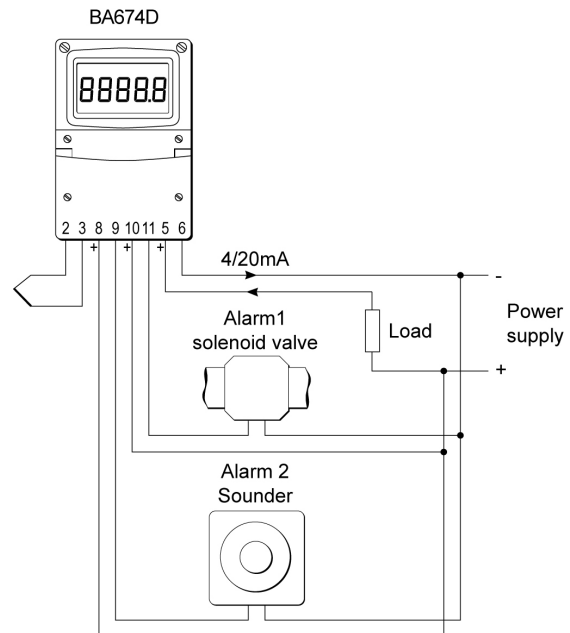

Fig 10 Typical alarm application

9.4.2 Alarm configuration

Alarm configuration may be performed via the HART®
digital communication, see the BA47X/67X Indicating
Temperature Transmitter HART® Interface Guide
which   may   be   downloaded   from
www.beka.co.uk/manuals, or using the configuration
menu which is accessed via the four push buttons
located behind the instrument switch cover, see Fig 4.
When   frequent   adjustments   are   required   the
transmitter can be supplied with a keypad mounted
on the outside of this cover.

When a BA674D indicating temperature transmitter is
supplied with optional alarms the conditioning menu is
extended as shown in Fig 11.   The additional alarm
functions appear between 'bAr' and 'CodE' in the
configuration menu. For simplicity Fig 11 only shows
the additional sub-functions for alarm 1, but alarm 2
has identical sub-functions.

The following table summarises each of the alarm
configuration functions and includes a cross
reference to more detailed information.   Again only
the functions for alarm 1 are listed, but alarm 2 has
identical functions.

Summary of programmable alarm functions

Display   **Description of function**

'ALr1'   **Alarm 1**
'ALr2'   **Alarm 2**
The two functions **e**ach contain seven
identical sub-functions, one set for
configuration alarm 1 and the other for
configuration alarm 2.
See section 9.4.3 and Fig 11.

'EnbL'   **Alarm enable**
Enables or disables the alarm function
without changing the alarm parameters.
See section 9.4.4

'SP1'   **Alarm setpoint 1**
Adjusts the alarm setpoint. The alarm is
activated when the indicator display
equals the setpoint.
See section 9.4.5

'Hi.Lo'   **Alarm function**
Defines whether the alarm has a high or
low function.
See section 9.4.6

'no.nC'   **Normally open or normally closed
output**
Determines whether the single pole alarm
output is open or closed in the non-alarm
condition.
See section 9.4.7

'HStr'   **Hysteresis**
Adjusts the alarm hysteresis.
See section 9.4.8

'dELA'   **Alarm delay time**
Adjusts the delay between the display
equalling the setpoint and the alarm
output being activated.
See section 9.4.9

'SiL'   **Alarm silence time**
Defines the time that the alarm output
remains in the non-alarm condition
following acceptance of an alarm.
See section 9.4.10

'ACSP'   **Access setpoint**
Enables direct access to the alarm
setpoints from the transmitter operational
mode i.e. when it is displaying
temperature. Access may be protected
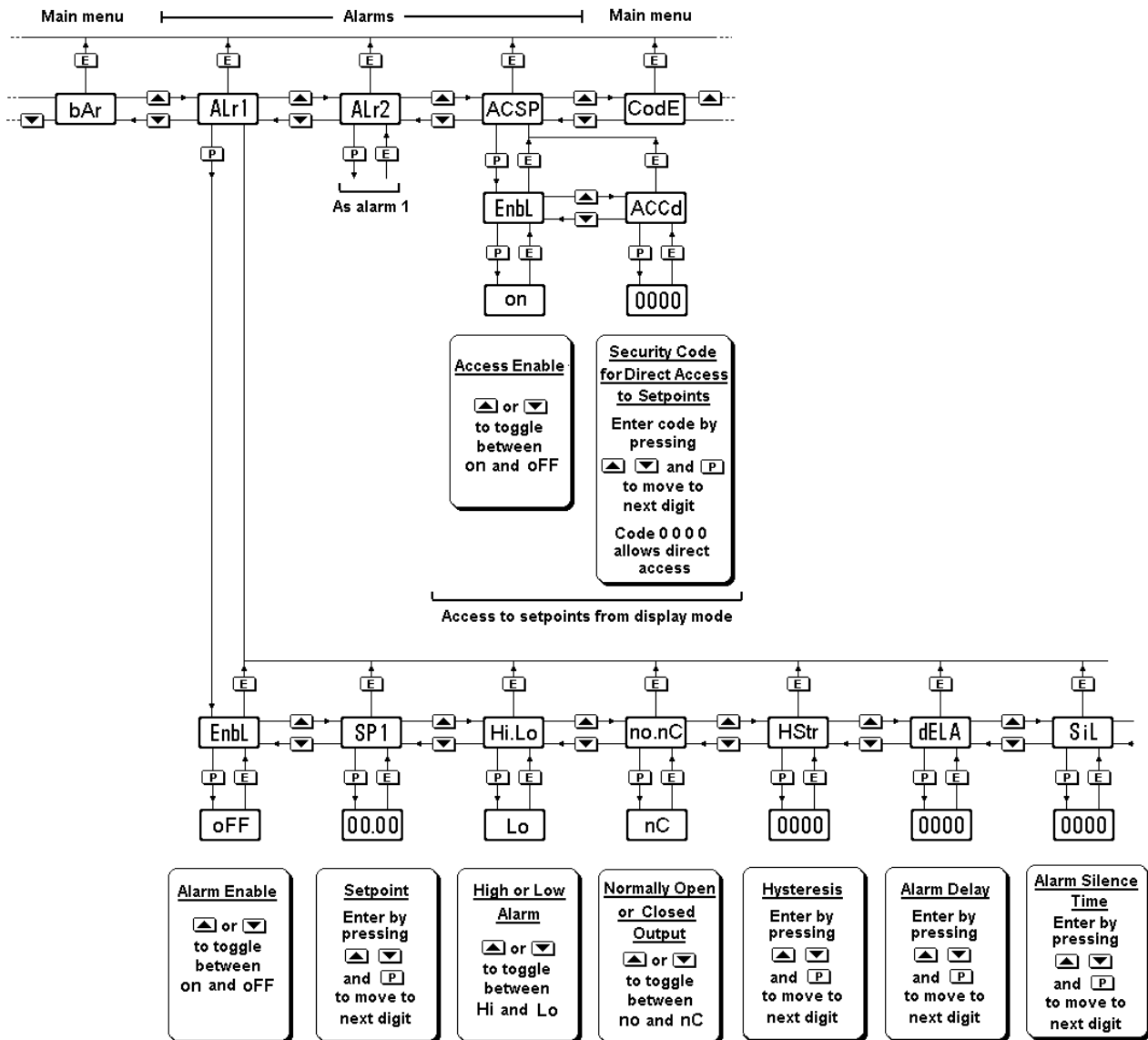by a separate security code.
See section 9.4.11

Fig 11   Alarm conditioning menu

9.4.3 Alarm selection: ALr1 or ALr2

As shown in Fig 11, each of the two alarms has an identical set of sub-functions enabling each alarm to be independently conditioned. 'ALr1 provides access to the alarm 1 sub-functions and 'ALr2' provides access to the alarm 2 sub-functions. The following sections 9.4.4 to 9.4.10 describe each of these sub-functions in detail

9.4.4 Alarm enable: EnbL

This sub-function allows the alarm to be enabled or disabled without altering any of the alarm parameters. To check or change the sub-function select 'EnbL' from the alarm sub-menu using the ▼ or ▲ button and press *P* which will reveal the current setting. The function can be changed by pressing the ▼ or ▲ button followed by the *E* button to enter the selection and return to the 'EnbL' prompt in the alarm menu.

9.4.5 Setpoint adjustment: SP1

The setpoint of each alarm relates to the transmitter digital display and may be positioned anywhere in the transmitter display range.

To adjust the setpoint select 'SP1' from the alarm menu and press *P* which will reveal the existing alarm setpoint with one digit flashing. The flashing digit may be adjusted using the ▼ or ▲ push button and the *P* button to move control to the next digit. When the required setpoint has been entered press *E* to enter the new setpoint and return to the 'SP1' prompt in the alarm menu.

Note: If, when configured for a voltage or resistance input the displayed decimal point has been set to autorange, it may be necessary to manually position the decimal point before adjusting 'SP1' or 'SP2'. This can be achieved by repeatedly operating the *P* button until the activated decimal point flashes, the decimal point can then be positioned using either the ▼ or ▲ button. Pressing the *P* button again will return control to one of the digits.

9.4.6 Alarm function: Hi.Lo

Each alarm can be independently conditioned as a high or low alarm. To check or change the alarm function select 'Hi.Lo' from the alarm menu using the ▼ or ▲ button and press *P* to reveal the current setting. The function may be changed by pressing the ▼ or ▲ button, pressing the *E* button will enter the setting and return the display to the 'Hi.Lo' prompt in the alarm menu.

9.4.7 Alarm output status: no.nC

This sub-function allows the alarm output to be open or closed in the non-alarm condition. When deciding which is required, care must be taken to ensure that the alarm output is fail safe. See Fig 8.

    'no'   Alarm output open in non-alarm condition
    'nC'   Alarm output closed in non-alarm condition
                        CAUTION

When the transmitter supply is removed both alarm outputs will open irrespective of conditioning. Therefore for fail safe operation both alarm outputs should be conditioned to be open in the alarm condition.

To check or change the alarm output status select 'no.nC' from the alarm menu using the ▼ or ▲ button and press *P* to reveal the current setting. The function can be changed by pressing the ▼ or ▲ button followed by the *E* button to enter the setting and return to the 'no.nC' prompt in the alarm menu.

9.4.8 Hysteresis: HStr

Hysteresis is shown in the same units as the transmitter digital display.

To adjust the hysteresis, select 'HStr' from the alarm menu using the ▼ or ▲ button and press *P* which will reveal the existing figure with one digit flashing. The flashing digit can be adjusted using the ▼ or ▲ push buttons, and the *P* button to move control to the next digit. When the required hysteresis has been entered, press *E* to enter the new setting and return to the 'HStr' prompt in the alarm menu.

e.g. A BA674D transmitter with a high alarm set at 90.0 and hysteresis of 10.0 will perform as follows:

    The alarm will be activated when the display
    equals or exceeds 90.0, but will not be
    deactivated until the display falls below 80.0.

Note: If, when configured for a voltage or resistance input the displayed decimal point has been set to autorange, it may be necessary to manually position the decimal point before adjusting 'HStr'. This can be achieved by repeatedly operating the *P* button until the activated decimal point flashes, the decimal point can then be positioned using either the ▼ or ▲ button. Pressing the *P* button again will return control to one of the digits.

9.4.9 Alarm delay: dELA

This function enables activation of the alarm output to be delayed for a fixed time following the alarm condition occurring. The delay can be set in 1 second increments up to 3600 seconds. If a delay is not required zero should be entered. To adjust the delay select 'dELA' using the ▼ or ▲ button from the alarm menu and press *P* which will reveal the existing delay with one digit flashing. The flashing digit can be adjusted using the ▼ or ▲ push button, and the *P* button to move control to the next digit. When the required delay has been entered, press *E* to enter the new setting and return to the 'dELA' prompt in the alarm menu.

When an alarm occurs, the alarm annunciator will flash until the delay time expires, when the alarm will be activated and the annunciator will stop flashing.

9.4.10 Alarm silence time: SiL

This function is primarily intended for use in small installations where the alarm output directly operates a warning sounder or beacon. When the alarm silence time is set to any figure other than zero, the *P* push button becomes an alarm accept button. After an alarm has occurred, operating the *P* button will cause the alarm output to revert to the non-alarm condition for the programmed alarm silence time. Ideally the BA674D requires an optional external keypad for this function to be used.

To adjust the alarm silence time, which may be between 0 and 3600 seconds, select 'SiL' from the alarm menu using the ▼ or ▲ push button and press *P* to reveal the existing silence time with one digit flashing. The flashing digit can be adjusted using the ▼ or ▲ push button and the *P* button to move control to the next digit. When the required time has been entered press *E* to return to the 'SiL prompt in the alarm menu.

When an alarm is cleared using the *P* push button, the alarm annunciator will flash until the silence time expires, if the alarm condition still exists the alarm will be reactivated.

9.4.11 Access Setpoint: ACSP
This function controls a separate menu that provides direct access to the alarm setpoints when the BA674D transmitter is in the operational mode. The function enables an operator to adjust the alarm setpoints without having access to the configuration and alarm menus. Further protection is provided by a separate security code. Both setpoints can always be displayed, but not adjusted, from the operating mode using the *E* plus the ▼ or ▲ button – see section 3.1

This direct access menu is enabled and a separate security code entered from the 'ACSP' function in the configuration menu as shown in Fig 11. To check or change the menu parameters select 'ACSP' from the menu using the ▼ or ▲ button and press *P* which will display the enable prompt 'EnbL'. Press *P* again to reveal the current setting which may be changed using the ▼ or ▲ button.

If 'oFF' is selected, the operator will not have access to the setpoints from the display mode. If 'on' is selected, the operator will have direct access to the alarm setpoints from the operational mode via a separate optional security code. Press *E* to enter the selection and return to the 'EnbL' prompt, pressing *E* again will return the 'ACSP' prompt in the configuration menu.

If the 'ACSP' function is enabled, access to the setpoints from the transmitter operational mode may be protected by an optional four digit code. This access code is defined by sub-function 'ACCd' which is reached from the 'EnbL' prompt by pressing the ▼ or ▲ button. Pressing *P* will then reveal the current

security code with one digit flashing. The flashing digit may be changed by operating the ▼ or ▲ push button and the *P* button to move control to the next digit. When the required code has been entered, press *E* twice to return to the 'ACSP' prompt in the configuration menu.

Code 0000 disables this security code allowing, when enabled, direct access to the setpoints from the display mode by pressing the *P* and ▲ buttons simultaneously.

New instruments with alarms are supplied with this function disabled and the security code set to 0000

9.4.12 Adjusting alarm setpoints from the operational mode
Access to the alarm setpoints from the transmitter operational mode is obtained by operating the *P* and ▲ push buttons simultaneously as shown in Fig 15. If the setpoints are not protected by a security code the alarm setpoint prompt 'SP1' will be displayed. If the setpoints are protected by a security code, 'CodE' will be displayed first. Pressing *P* again will enable the alarm security code to be entered digit by digit using the ▼ or ▲ button to adjust the flashing digit, and the *P* push button to move control to the next digit. If the correct code is entered pressing *E* will cause alarm setpoint prompt 'SP1' to be displayed. Pressing the ▼ or ▲ button will toggle between the two alarm setpoint prompts 'SP1' and 'SP2'.

If an incorrect security code is entered, or a button is not pressed within ten seconds, the transmitter will return to the display mode.
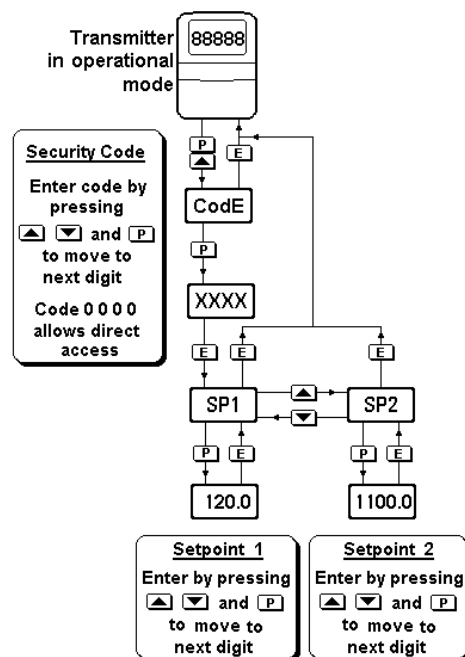

Fig 12 Setpoint adjustment from the display mode

To adjust an alarm setpoint select 'SP1' or 'SP2' and press *P* which will reveal the current setting with one digit flashing. Each digit of the setpoint may be adjusted using the ▼ or ▲ push button and the *P* button to move control to the next digit. When the required setpoint has been entered, pressing *E* will return the display to the 'SP1' or 'SP2' prompt from which the other setpoint may be selected, or the transmitter may be returned to the operational mode by pressing *E* again.

Note: Direct access to the alarm setpoints is only available when the menu is enabled - see section 9.4.11.