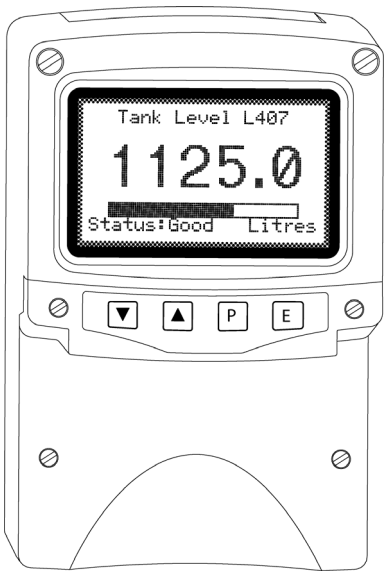
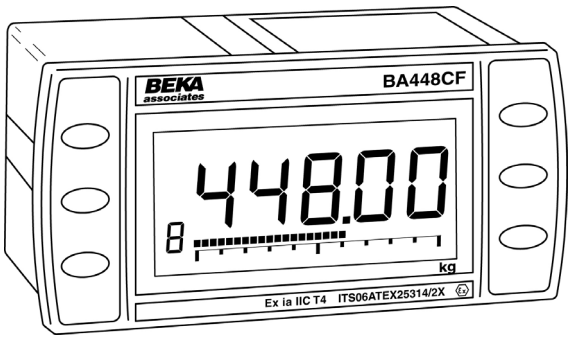
FOUNDATION™ fieldbus Indicators and Displays

Fieldbus Interface Guide





FOUNDATION

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This guide applies to the following models:

Multiple Variable Fieldbus Display

BA484DF-F - *Field mounted, Intrinsically Safe*
BA488CF-F - *Panel mounted, Intrinsically Safe*
BA684DF-F - *Field mounted, Safe Area*
BA688CF-F - *Panel mounted, Safe Area*

Single Variable Fieldbus Indicator

BA414DF-F - *Field mounted, Intrinsically Safe*
BA414NDF-F - *Field mounted, Type nL*
BA418CF-F - *Panel mounted, Intrinsically Safe*
BA614DF-F - *Field mounted, Safe Area*
BA618CF-F - *Panel mounted, Safe Area*

Eight Variable Fieldbus Indicator

BA444DF-F - *Field mounted, Intrinsically Safe*
BA444NDF-F - *Field mounted, Type nL*
BA448CF-F - *Panel mounted, Intrinsically Safe*
BA644DF-F - *Field mounted, Safe Area*
BA648CF-F - *Panel mounted, Safe Area*

Can’t make it work ?

Please refer to the Troubleshooting section in Appendix B for common problems and their solutions!

If you still need assistance, please contact us directly:

Tel: +44 (0)1462 438301
Email: **support@beka.co.uk**

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Introduction

This guide gives all the necessary information to use our Fieldbus Displays and indicators on a FOUNDATION™ fieldbus installation.

Several other protocols are commonly used in industry which we may choose to support as market demand rises. This guide and others will periodically be updated, so please come back to our website regularly for the latest information.

For hardware installation information, please refer to the separate instruction manuals available for each model.

What's in this Fieldbus Interface Guide

- An overview of each instrument
- A description of the parameters that are applicable to each instrument.
- Instructions on how to use the instrument using its standard screens

What's in the Instruction Manuals

- An overview of the instrument
- Intrinsic Safety Certification information
- System Design and Installation
- Configuration
- Maintenance

Other sources of information

Our website at ***www.beka.co.uk*** is kept up to date with the latest literature and information

After reading through this guide, if you still have a problem getting the results you need then email us at ***support@beka.co.uk*** and we will do our best to help you – but please first make sure you've looked through the troubleshooting section in Appendix B.

Displays Vs Indicators

The displays and indicators are internally very similar, but present the data in totally different ways. The simpler Indicators have a non-backlit 5 digit, 7 segment display and 31 segment bargraph and are designed to give a cost effective indication to operators. The more comprehensive Displays have a configurable backlit dot-matrix LCD, and have provision for external pushbuttons and alarm outputs.

The Eight Variable Indicator is able to operate in a "Listener" mode whereby it does not appear as a device on the network, but simply listens for appropriate data on the segment it is connected to. All configuration must be performed locally, but thereafter it imposes no overhead on the network. This mode is useful where timing is critical, in retrofit applications or when node licensing costs need to be minimised.

Product Overview

A detailed overview of the instrument is given in the instruction manual for each product. This should be read before implementing any system using these instruments. However it is useful to summarise the main features of the product before attempting to design any controlling software application.

Multiple Variable Fieldbus Display

Display

The instrument display is organised as 120 pixels horizontally by 64 pixels vertically. Each pixel is approximately 0.7mm square which makes it ideal for displaying text and simple graphics. The size of each pixel improves the contrast and hence the readability at greater distances.

The display is also backlit by an ultra-efficient green LED module which enables the screen to be viewed in all conditions, from bright sunlight to total darkness.

Analogue Input Display

The purpose of this instrument is to display variables that exist on the fieldbus. Eleven pre-programmed screen layouts are available to display one, two, three, four or eight variables simultaneously. Some of the screens also feature bargraphs. A total of eight (8) variables can be accessed by using the front panel push buttons.

Switch Inputs

The multiple variable models have six switches on the front of the panel mounted instrument, and four on the field mounted instrument. Both instruments have the option of overriding these with up to six external switches which can be sized and labelled to suit the application. These switches are for selecting the variables to be viewed and accessing the local configuration menu. Although keypresses may be detected by acyclically querying the transducer block (usually difficult to implement outside of commissioning), it is not possible to use them in a cyclic control scheme. However, the eight variable indicator does offer this functionality.

Switch Outputs

As an optional accessory (available only at the time of ordering), the multiple variable models can be fitted with six switch outputs. These are totally isolated and can be energised or de-energised independently of each other. Alarm set-point values can be assigned by using the local configuration menu so that they operate independently of the host application. Note that they cannot be used as conventional FOUNDATION™ fieldbus alarms, and should be used for indication only.

There is no communication of status across the fieldbus other than reading the appropriate transducer block parameters acyclically . If no alarm set points have been assigned it is possible to control these outputs by writing to the appropriate transducer block parameters acyclically, but this is usually difficult to implement outside of commissioning.

Single Variable Fieldbus Indicator

Display

The instrument display is organised as a 5 digit (plus sign) display with a 31 segment bargraph. Although the size of the digits is fixed at 20mm, the displayed precision may be changed. The bargraph and its associated scale may be turned off for those applications where it is deemed inappropriate. All configuration is performed over the fieldbus.

There are no push buttons or switch outputs on this model.

Eight Variable Fieldbus Indicator

Function

The indicator may be configured either as a conventional addressable node, or as a listener. In listener mode it does not appear on the host's "live list" and can be used to display the value of any variables being broadcast on the connected segment. In addition, it does not take up any time in the macro-cycle, nor does it add to the cost of the host licence fees. The major disadvantage is that all configuration must be performed using the local configuration menu, as the host cannot communicate with the indicator in this mode.

Display

The instrument display is organised as a 5 digit (plus sign) display with a 31 segment bargraph. Although the size of the digits is fixed at 20mm, the displayed precision may be changed. The bargraph and its associated scale may be turned off for those applications where it is deemed inappropriate.

Analogue Input Display

The purpose of this instrument is to display variables that exist on the fieldbus. A total of eight (8) variables can be accessed by using the front panel push buttons to scroll between them. The format of each variable and its associated bargraph can be configured independently.

Switch Inputs

The eight variable indicator has six switches on the front of the panel mounted instrument, and four on the field mounted instrument. These switches can be used in a cyclic control scheme as each one is connected to its own DI function block. They are also used for selecting the variables to be viewed and accessing the local configuration menu.

There are no switch outputs on this model.

Supported Models and Device Revisions

There are three basic models available: a multiple variable display, a single variable indicator and an eight variable indicator:

- Specific models of the multiple variable display are available with support for either the FOUNDATION™ fieldbus or PROFIBUS PA protocols. The protocol is determined during manufacture and cannot be changed.
    - The FOUNDATION™ fieldbus version Revision 3 uses uses two four-input IS (Input Selector) function blocks.

      Earlier revisions contained several functions that have been depreciated. These involve the use of acyclic data transfers to create custom screens, read pushbutton status and directly write switch outputs. For legacy installations new displays can still be supplied with earlier firmware revisions **by request at the time of ordering.**
    - The PROFIBUS PA version uses eight AO (Analogue Output) and six DI (Digital Input) function blocks which allow the pushbuttons to be used for operator feedback.
- The single variable indicator is only available with the FOUNDATION™ fieldbus protocol, and uses the first input of a single four-input IS (Input Selector) function block.
- Specific models of the eight variable indicator are available with support for either the FOUNDATION™ fieldbus or PROFIBUS PA protocols. The protocol is determined during manufacture and cannot be changed.
    - The FOUNDATION™ fieldbus version uses two four-input IS (Input Selector) and six DI (Digital Input) function blocks.
    - The PROFIBUS PA version uses eight AO (Analogue Output) and six DI (Digital Input) function blocks

  Both models can display one variable at a time, along with an associated bargraph. The pushbuttons are easily used for operator feedback. They may be configured on-site as either an addressable node or a listener.

As there are numerous differences between these versions, each model variant has its own section in this manual. The appendix at the rear gives common information about the blocks, data structures and numeric formats in detail.

Multiple Variable Fieldbus Display :

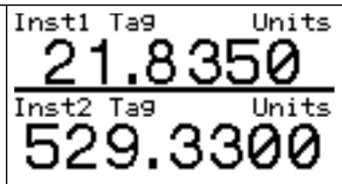
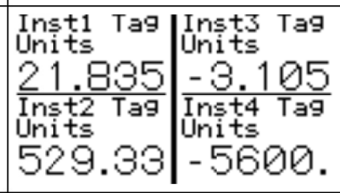
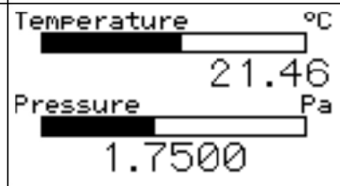
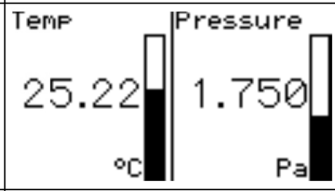
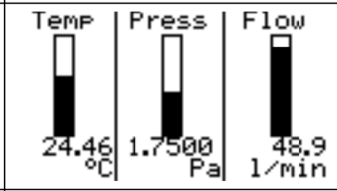
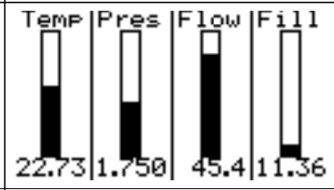
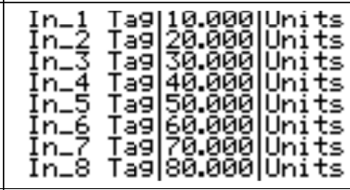
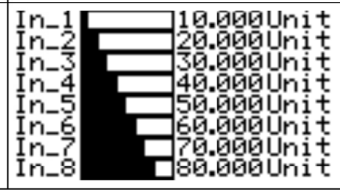
This section applies to the following models:

BA484DF-F - *Field mounted, Intrinsically Safe*
BA488CF-F - *Panel mounted, Intrinsically Safe*
BA684DF-F - *Field mounted, Safe Area*
BA688CF-F - *Panel mounted, Safe Area*

Standard Screens

There are eleven standard screens available. They are capable of displaying a selection of up to eight process variables, together with their units of measure and tag description. Once a screen format has been chosen, each input variable can be brought into view by pressing the up and down arrow keys.

The screen format is selected by using the local configuration menu as described in the Instruction Manual. One of eleven standard display formats can be selected as shown in the following table:

One Variable		Two Variables	
Four Variables		One + H-Bar	
Two + H-Bars		One + V-Bar	
Two + V-Bars		Three + V-Bars	
Four + V-Bars		Eight Variables	
Eight + Bars			

Device Revision 3

The following section applies to the BA484DF, BA488CF, BA684DF and BA688CF models at device revision 3

Block Identifiers

FF blocks
Resource block
IS 1 function block
IS 2 function block
DISP8TB transducer block

Putting the Fieldbus Display into service

In accordance with FOUNDATION Fieldbus requirements, a new unit supplied from the factory will have all its blocks set to OOS (Out Of Service). The ***TARGET_MODE*** parameter of EVERY block must be set to AUTO before the display can be used. The bitstring values are shown in the table below:

Target Mode and Actual Mode	Value
MODE_AUTO	0x08
MODE_OOS	0x80

When a higher priority block is set to OOS then this will affect the output status of all lower priority blocks. In this instrument, the resource block has the highest priority and each transducer block and function block the lowest. Therefore, turning the resource block OOS will disable the entire instrument.

The **"SELECT_TYPE"** parameter in the IS function block must be initialised to any valid type for data to be passed to the display. If the IS block is otherwise unused, select a type of "First good".

Note that unlike many other protocols, FOUNDATION Fieldbus does not require a unique numeric addresses to be manually assigned to each device on the network.

Configuring the values to be displayed

The unit can be configured to display up to eight values. The screen format is selected via the local configuration menu which is fully documented in the Instruction Manual.

The IS_1 Function Block values ***IN_1*** to ***IN_4*** and IS_2 Function Block values ***IN_1*** to ***IN_4*** should be assigned to the variables that need to be displayed. The data structure used is DS-65 Floating Point Value + Status. Note that IS_1 inputs are mapped to display values 1-4 and IS_2 inputs are mapped to display values 5-8.

If the data has a status of **BAD**, or a status of **GOOD** but with a quality sub-status of "**INITIATE FAULT STATE**" or "**FAULT STATE ACTIVE**" then the appearance of the value will be in inverse video i.e. clear pixels on a dark background.

The **"SELECT_TYPE"** parameter in the IS function block must be initialised to any valid type for data to be passed to the display. If the IS block is otherwise unused, select a type of "**FIRST GOOD**".

If local setpoints have been defined, then the displayed value will flash when that point has been reached. The appropriate output will also be activated.

Using Acyclic transfers to display data

It is possible to use the display with hosts that do not support the IS Function Block, by writing valid data directly to the DISP8TB transducer block instead. To achieve this, both IS Function Blocks should be set to OOS (Out Of Service). Values can then be directly written to the ***IN_DATA_n*** parameters in the DISP8TB Transducer Block. The DS-BEKA-4 data structure (Index 258) has a 4 byte float ***IN_VALUE*** parameter which corresponds to the value, and a single byte ***IN_VALUE_STATUS*** parameter which corresponds to the status. The DISP8TB Transducer block has a read-only ***CYCLIC_ON*** parameter which is set to 0xFF if cyclic data transfers are taking place, or 0x00 if not. this can be used by the host to verify that the display it is set up appropriately.

Configuring Units display and Tag information

The "Tag" and "Units" displayed on each of the "standard" screens can be entered remotely by writing to the ***IN_DATA_n*** parameters in the DISP8TB Transducer Block. The DS-BEKA-4 data structure (Index 258) has a 16 byte Visible String ***DESCRIPTOR*** parameter which corresponds to the Tag value, and a 8 byte Visible String ***UNITS*** parameter. Each input can therefore be given its own unique data.

Information written in this way is saved to non-volatile memory and is retained if the power is cycled.

To simplify temperature display, the **`** character (alt+096) is mapped to the degrees symbol.
For example, the string **`Temp `C`** is displayed as **Temp °C**

Setting The Display Format

Each value displayed on standard screens may have its format changed to suit the intended application. This is achieved by writing to the ***IN_DATA_n*** parameters in the DISP8TB Transducer Block. The DS-BEKA-4 data structure (Index 258) has a single byte ***DISPLAY_FORMAT*** parameter which is enumerated as follows:

DISPLAY_FORMAT	Meaning
0	No Decimal Places
1	One Decimal Place
2	Two Decimal Places
3	Three Decimal Places
4	Four Decimal Places
5	Auto Format

Information written in this way is saved to non-volatile memory and is retained if the power is cycled.

Setting Bargraph Limits

The upper and lower limits for each bargraph displayed on the "standard" screens can be entered remotely by writing to the ***IN_DATA_n*** parameters in the DISP8TB Transducer Block. The DS-BEKA-4 data structure (Index 258) has 4 byte float ***BARGRAPH_MIN*** and ***BARGRAPH_MAX*** parameters for each input.

Information written in this way is saved to non-volatile memory and is retained if the power is cycled.

Gain and Offset Factors

Many applications require that the process variables are displayed in different units to those used by the host. The facility to scale a value before it is displayed is incorporated into the display. Each input value can be scaled independently by writing to the ***IN_DATA_n*** parameters in the DISP8TB Transducer Block. The DS-BEKA-4 data structure (Index 258) has 4 byte float ***ZERO_OFFSET*** and ***GAIN_FACTOR*** parameters for each input.

Information written in this way is saved to non-volatile memory and is retained if the power is cycled.

Scaling is applied to the specified input data prior to its display. Both numeric display and bargraphs are affected on the standard screens. The scaling calculation is as follows:

Displayed Value = (Input Value x Gain Factor) + Zero Offset

Reading the approximate ambient temperature

The DISP8TB Transducer Block contains an ***INSTRUMENT_TEMPERATURE*** parameter which shows the temperature of the fieldbus display in degrees Celcius (+/- 5°C), returned as a read-only 4-byte float.

BLOCK_ERR and XD_ERROR Parameters

The unit is able to report any error conditions via these parameters.

The ***BLOCK_ERR*** parameter can return the following values:

Block	Reason Code	Comment
Resource	0 = Other	Not currently set *(Reserved for future use)*
Resource	6 = Device Needs Maintenance Soon	Not currently set *(Reserved for future use)*
Resource	10 = Lost Static Data / EEPROM error	An EEPROM error has been detected. All EEPROM contents are reset to its initial values. (The EEPROM check is done one time during device startup)
Resource	13 = Device Needs Maintenance Now	Internal Communications Error. The display processor and Fieldbus interface have lost contact.
Resource	15 = Out-of-Service	Actual mode of block is *Out-of-Service*
IS	1 = Block Configuration Error	
IS	4 = Local Override	The block is in mode *Local-Override*. The block switches to this state when the FAULT_STATE parameter of the RESB is set to ACTIVE. (The FAULT_STATE parameter is not modified locally it is always set by a remote host device.)
IS	15 = Out-of-Service	Actual mode of block is *Out-of-Service*
Transducer	15 = Out-of-Service	Actual mode of block is *Out-of-Service*

XD_ERROR returns 0x00 indicating that no error condition is present.

The use of these parameters is may change in future versions of this product.

Single Variable Fieldbus Indicator :

This section applies to the following models:

BA414DF-F - *Field mounted, Intrinsically Safe*
BA414NDF-F - *Field mounted, Type nL*
BA418CF-F - *Panel mounted, Intrinsically Safe*
BA614DF-F - *Field mounted, Safe Area*
BA618CF-F - *Panel mounted, Safe Area*

Device Revision 2

The following section applies to the BA414DF, BA418CF, BA614DF and BA618CF models at device revision 2

Block Identifiers

FF blocks
Resource block
IS (Input Selector) function block
DISP1TB transducer block

Putting the Fieldbus Indicator into service

In accordance with FOUNDATION Fieldbus requirements, a new unit supplied from the factory will have all its blocks set to OOS (Out Of Service). The ***TARGET_MODE*** parameter of EVERY block must be set to AUTO before the indicator can be used. The bitstring values are shown in the table below:

Target Mode and Actual Mode	Value
MODE_AUTO	0x08
MODE_OOS	0x80

When a higher priority block is set to OOS then this will affect the output status of all lower priority blocks. In this instrument, the resource block has the highest priority and each transducer block and function block the lowest. Therefore, turning the resource block OOS will disable the entire instrument.

The **"SELECT_TYPE"** parameter in the IS function block must be initialised to any valid type for data to be passed to the display. If the IS block is otherwise unused, select a type of "First good".

Note that unlike many other protocols, FOUNDATION Fieldbus does not require a unique numeric addresses to be manually assigned to each device on the network.

Configuring the value to be displayed

The unit is limited to the display of one value, together with a bargraph.

The IS Function Block value ***IN_1*** should be assigned to the variable that needs to be displayed. The data structure used is DS-65 Floating Point Value + Status.

The **"SELECT_TYPE"** parameter in the IS function block must be initialised to any valid type for data to be passed to the display. If the IS block is otherwise unused, select a type of "First good".

If the data has a status of **BAD**, or a status of **GOOD** but with a quality sub-status of "**INITIATE FAULT STATE**" or "**FAULT STATE ACTIVE**" then the value will be alternated with the word "bAd" on the display

Using Acyclic transfers to display data

It is possible to use the indicator with hosts that do not support the IS Function Block, by writing valid data directly to the DISP1TB transducer block instead. To achieve this, the IS Function Block should be set to OOS (Out Of Service). Values can then be directly written to the ***IN_DATA*** parameter in the DISP1TB Transducer Block. The DS-65 data structure has a 4 byte float ***VALUE*** and a single byte ***STATUS*** parameter which must be set accordingly. The DISP1TB Transducer block has a read-only ***CYCLIC_ON*** parameter which is set to 0xFF if cyclic data transfers are taking place, or 0x00 if not. this can be used by the host to verify that the display it is set up appropriately.

Setting The Display Format

The displayed value may have its format changed to suit the intended application. This is achieved by writing to the ***DISP_FORMAT*** parameter in the DISP1TB Transducer Block. This single byte value is enumerated as follows:

DISP_FORMAT	Meaning
0	No Decimal Places
1	One Decimal Place
2	Two Decimal Places
3	Three Decimal Places
4	Four Decimal Places
5	Auto Format

This parameter is saved to non-volatile memory and is retained if the power is cycled.

Setting Bargraph Limits

The upper and lower limits for the bargraph display can be entered remotely by writing to the ***BARGRAPH_MIN*** and ***BARGRAPH_MAX*** parameters in the DISP1TB Transducer Block.

Note that the bargraph may be turned on and off by writing to the ***BARGRAPH*** parameter in the DISP1TB Transducer Block. This single byte value is enumerated as follows:

BARGRAPH	Meaning
0	Disabled
1	Left Align (Default)
2	Centre Align
3	Right Align

All parameters are saved to non-volatile memory and is retained if the power is cycled.

Gain and Offset Factors

Many applications require that the process variables are displayed in different units to those used by the host. The facility to scale the value before it is displayed is incorporated into the display. The input value can be scaled by writing to the ***ZERO_OFFSET*** and ***GAIN_FACTOR*** parameters in the DISP1TB Transducer Block.

Information written in this way is saved to non-volatile memory and is retained if the power is cycled.

Scaling is applied to the input data prior to its display. Both numeric display and bargraph are affected.

The scaling calculation is as follows:

Displayed Value = (Input Value x Gain Factor) + Zero Offset

where Input Value is taken from ***IN_DATA*** or ***IN_1***

Reading the instrument ambient temperature

The DISP1TB Transducer Block contains an ***INSTRUMENT_TEMPERATURE*** parameter which shows the temperature of the fieldbus indicator in degrees Celcius (+/- 1°C), returned as a read-only 4-byte float.

BLOCK_ERR and XD_ERROR Parameters

The unit is able to report any error conditions via these parameters.

The ***BLOCK_ERR*** parameter can return the following values:

Block	Reason Code	Comment
Resource	0 = Other	Not currently set *(Reserved for future use)*
Resource	6 = Device Needs Maintenance Soon	Not currently set *(Reserved for future use)*
Resource	10 = Lost Static Data / EEPROM error	An EEPROM error has been detected. All EEPROM contents are reset to its initial values. (The EEPROM check is done one time during device startup)
Resource	13 = Device Needs Maintenance Now	Not currently set *(Reserved for future use)*
Resource	15 = Out-of-Service	Actual mode of block is *Out-of-Service*
IS	1 = Block Configuration Error	
IS	4 = Local Override	The block is in mode *Local-Override*. The block switches to this state when the FAULT_STATE parameter of the RESB is set to ACTIVE. (The FAULT_STATE parameter is not modified locally it is always set by a remote host device.)
IS	15 = Out-of-Service	Actual mode of block is *Out-of-Service*
Transducer	15 = Out-of-Service	Actual mode of block is *Out-of-Service*

XD_ERROR returns 0x00 indicating that no error condition is present.

The use of these parameters is may change in future versions of this product.

Eight Variable Fieldbus Indicator:

This section applies to the following models:

BA444DF-F - *Field mounted, Intrinsically Safe*
BA444NDF-F - *Field mounted, Type nL*
BA448CF-F - *Panel mounted, Intrinsically Safe*
BA644DF-F - *Field mounted, Safe Area*
BA648CF-F - *Panel mounted, Safe Area*

Device Revision 1

The following section applies to the BA444DF, BA448CF, BA644DF and BA648CF models at device revision 1

Block Identifiers

FF blocks
Resource block
IS (Input Selector) function block
DI function block
DITB custom DI transducer block
DISP_8_INDTB transducer block

Putting the Fieldbus Indicator into service

In accordance with FOUNDATION Fieldbus requirements, a new unit supplied from the factory will have all its blocks set to OOS (Out Of Service). The ***TARGET_MODE*** parameter of EVERY block must be set to AUTO before the indicator can be used. The bitstring values are shown in the table below:

Target Mode and Actual Mode	Value
MODE_AUTO	0x08
MODE_OOS	0x80

When a higher priority block is set to OOS then this will affect the output status of all lower priority blocks. In this instrument, the resource block has the highest priority and each transducer block and function block the lowest. Therefore, turning the resource block OOS will disable the entire instrument.

The **"SELECT_TYPE"** parameter in the IS function block must be initialised to any valid type for data to be passed to the display. If the IS block is otherwise unused, select a type of "First good".

Note that unlike many other protocols, FOUNDATION Fieldbus does not require a unique numeric addresses to be manually assigned to each device on the network.

Configuring the value to be displayed

The unit is limited to the display of one value at a time, together with a bargraph.

The IS_1 Function Block values ***IN_1*** to ***IN_4*** and IS_2 Function Block values ***IN_1*** to ***IN_4*** should be assigned to the variables that need to be displayed. The data structure used is DS-65 Floating Point Value + Status. Note that IS_1 inputs are mapped to display values 1-4 and IS_2 inputs are mapped to display values 5-8. The ***DISPLAY_CHANNEL*** parameter in each IS Function Block is enumerated to show these mappings to the host user.

The **"SELECT_TYPE"** parameter in the IS function block must be initialised to any valid type for data to be passed to the display. If the IS block is otherwise unused, select a type of "First good".

If the data has a status of **BAD**, or a status of **GOOD** but with a quality sub-status of "**INITIATE FAULT STATE"** or "**FAULT STATE ACTIVE"** then the value will be alternated with the word "bAd" on the display

Using Acyclic transfers to display data

It is not possible to use acyclic transfers to display data on this product.

Setting The Display Format

The displayed value may have its format changed to suit the intended application. This is achieved by writing to the ***DISP_FORMAT*** parameter in the DISP1TB Transducer Block. This single byte value is enumerated as follows:

DISP_FORMAT	Meaning
0	No Decimal Places
1	One Decimal Place
2	Two Decimal Places
3	Three Decimal Places
4	Four Decimal Places
5	Auto Format

This parameter is saved to non-volatile memory and is retained if the power is cycled.

Setting Bargraph Limits

The upper and lower limits for the bargraph display can be entered remotely by writing to the ***BARGRAPH_MIN*** and ***BARGRAPH_MAX*** parameters in the DISP1TB Transducer Block.

Note that the bargraph may be turned on and off by writing to the ***BARGRAPH*** parameter in the DISP1TB Transducer Block. This single byte value is enumerated as follows:

BARGRAPH	Meaning
0	Disabled
1	Left Align (Default)
2	Centre Align
3	Right Align

All parameters are saved to non-volatile memory and is retained if the power is cycled.

Gain and Offset Factors

Many applications require that the process variables are displayed in different units to those used by the host. The facility to scale the value before it is displayed is incorporated into the display. The input value can be scaled by writing to the ***ZERO_OFFSET*** and ***GAIN_FACTOR*** parameters in the DISP1TB Transducer Block.

Information written in this way is saved to non-volatile memory and is retained if the power is cycled.

Scaling is applied to the input data prior to its display. Both numeric display and bargraph are affected.

The scaling calculation is as follows:

Displayed Value = (Input Value x Gain Factor) + Zero Offset

where Input Value is taken from ***IN_DATA*** or ***IN_1***

Reading the instrument ambient temperature

The DISP1TB Transducer Block contains an ***INSTRUMENT_TEMPERATURE*** parameter which shows the temperature of the fieldbus indicator in degrees Celcius (+/- 1°C), returned as a read-only 4-byte float.

BLOCK_ERR and XD_ERROR Parameters

The unit is able to report any error conditions via these parameters.

The ***BLOCK_ERR*** parameter can return the following values:

Block	Reason Code	Comment
Resource	0 = Other	Not currently set *(Reserved for future use)*
Resource	6 = Device Needs Maintenance Soon	Not currently set *(Reserved for future use)*
Resource	10 = Lost Static Data / EEPROM error	An EEPROM error has been detected. All EEPROM contents are reset to its initial values. (The EEPROM check is done one time during device startup)
Resource	13 = Device Needs Maintenance Now	Not currently set *(Reserved for future use)*
Resource	15 = Out-of-Service	Actual mode of block is *Out-of-Service*
IS	1 = Block Configuration Error	
IS	4 = Local Override	The block is in mode *Local-Override*. The block switches to this state when the FAULT_STATE parameter of the RESB is set to ACTIVE. (The FAULT_STATE parameter is not modified locally it is always set by a remote host device.)
IS	15 = Out-of-Service	Actual mode of block is *Out-of-Service*
Transducer	15 = Out-of-Service	Actual mode of block is *Out-of-Service*

XD_ERROR returns 0x00 indicating that no error condition is present.

The use of these parameters is may change in future versions of this product.

Appendix A

FOUNDATION Fieldbus

Reference Information

Data structures

All structures used are FOUNDATION Fieldbus standard definitions apart from the twor special structures given below:

DS-BEKA-4 - Display structure

	Parameter	Data Type	Size
1	BARGRAPH_MIN	Float	4
2	BARGRAPH_MAX	Float	4
3	DISPLAY_FORMAT	Unsigned8	1
4	ZERO_OFFSET	Float	4
5	GAIN_FACTOR	Float	4
6	DESCRIPTOR	VisibleString	16
7	UNITS	VisibleString	8
8	IN_VALUESTATUS	Unsigned8	1
9	IN_VALUE	Float	4

DS-BEKA-7 - Display structure

	Parameter	Data Type	Size
1	BARGRAPH	Unsigned8	1
2	BARGRAPH_MIN	Float	4
3	BARGRAPH_MAX	Float	4
4	DISPLAY_FORMAT	Unsigned8	1
5	ZERO_OFFSET	Float	4
6	GAIN_FACTOR	Float	4

The **BARGRAPH** parameter is enumerated as follows:

DISPLAY_FORMAT	**Meaning**
0	Disabled
1	Left Align (Default)
2	Centre Align
3	Right Align

The **DISPLAY_FORMAT** parameter is enumerated as follows:

DISPLAY_FORMAT	**Meaning**
0	No Decimal Places
1	One Decimal Place
2	Two Decimal Places
3	Three Decimal Places
4	Four Decimal Places
5	Auto Format

The standard FOUNDATION Fieldbus data structures used in BEKA products are given below:

DS-64 – Block Structure

	Parameter	Data Type	Size
1	Block_Tag	VisibleString	32
2	DD Member Id	Unsigned32	4
3	DD Item Id	Unsigned32	4
4	DD Revision	Unsigned16	2
5	Profile	Unsigned16	2
6	Profile Revision	Unsigned16	2
7	Execution Time	Unsigned32	4
8	Period of Execution	Unsigned32	4
9	Number of Parameters	Unsigned16	2
10	Next FB to Execute	Unsigned16	2
11	Starting Index of Views	Unsigned16	2
12	Number of View 3	Unsigned8	1
13	Number of View 4	Unsigned8	1

DS-65 - Value & Status – Floating Point Structure

	Parameter	Data Type	Size
1	Status	Unsigned8	1
2	Value	Float	4

DS-69 - Mode Structure

	Parameter	Data Type	Size
1	Target	Bitstring	1
2	Actual	Bitstring	1
3	Permitted	Bitstring	1
4	Normal	Bitstring	1

DS-70 – Access Permissions

	Parameter	Data Type	Size
1	Grant	Bitstring	1
2	Deny	Bitstring	1

DS-72 – Alarm Discrete Structure

	Parameter	Data Type	Size
1	Unacknowledged	Unsigned8	1
2	Alarm State	Unsigned8	1
3	Time Stamp	Time Value	8
4	Subcode	Unsigned16	2
5	Value	Unsigned8	1

DS-73 – Event Update Structure

	Parameter	Data Type	Size
1	Unacknowledged	Unsigned8	1
2	Update State	Unsigned8	1
3	Time Stamp	Time Value	8
4	Static Revision	Unsigned16	2
5	Relative Index	Unsigned16	2

DS-74 – Event Update Structure

	Parameter	Data Type	Size
1	Current	Bitstring	2
2	Unacknowledged	Bitstring	2
3	Unreported	Bitstring	2
4	Disabled	Bitstring	2

DS-85 – Test Structure

	Parameter	Data Type	Size
1	Value 1	Boolean	1
2	Value 2	Integer8	1
3	Value 3	Integer16	2
4	Value 4	Integer32	4
5	Value 5	Unsigned8	1
6	Value 6	Unsigned16	2
7	Value 7	Unsigned32	4
8	Value 8	Float	4
9	Value 9	Visible String	32
10	Value 10	Octet String	32
11	Value 11	Date	7
12	Value 12	Time of Day	6
13	Value 13	Time Difference	6
14	Value 14	Bitstring	2
15	Value 15	Time Value	8

Floating Point Format

Many values are given as 4 byte floating point numbers. This is defined in IEEE 754 as the Single-Precision format.

Visible String Format

It is very important that no non-printing characters are used in variables defined with the VisibleString format. Specifically, only ASCII values between 0x20 and 0x7E may be used.

Status-Byte

Measurement values are usually transferred as data structure DS-65 – Value & Status. In this structure a value is a four byte floating point number and the status information is one byte.

The status byte is made up of the following sections:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Quality		Quality Substatus				Limits	

Quality	Quality Substatus	Limits
00: Bad	**0000**: Non-specific **0001**: Configuration Error **0010**: Not Connected **0011**: Device Failure **0100**: Sensor Failure **0101**: No Communication (last usable value) **0110**: No Communication (no usable value) **0111**: Out of Service	**00**: Not limited **01**: Low limited **10**: High limited **11**: Constant
01: Uncertain	**0000**: Non-specific **0001**: Last Usable Value **0010**: Substitute **0011**: Initial Value **0100**: Sensor Conversion not Accurate **0101**: Engineering Unit Range Violation **0110**: Sub-normal	
10: Good (Non-Cascade)	**0000**: Non-specific **0001**: Active Block Alarm **0010**: Active Advisory Alarm (priority < 8) **0011**: Active Critical Alarm (priority > 8) **0100**: Unacknowledged Block Alarm **0101**: Unacknowledged Advisory Alarm **0110**: Unacknowledged Critical Alarm	
11: Good (Cascade)	**0000**: Non-specific **0001**: Initialisation Acknowledge **0010**: Initialisation Request **0011**: Not Invited **0100**: Not Selected **0101**: Local Override **0110**: **0111**: Fault State Active **1000**: Initiate Fault State	

Table Abbreviations:

SIZE	All sizes are given in bytes
READ / WRITE	RO – Read Only R/W – Read Write X – Don't Care Mix – Multi-Byte Records have a mix of the above types
STORE DEFINITIONS	S – Static A parameter which must be remembered through a power cycle. Writing to the parameter changes the static revision counter ST_REV. N – Non-volatile. A parameter which must be remembered through a power cycle, but which is not under the static update code. D – Dynamic. The value is calculated by the block, or read from another block. May be retained by the display processor. Mix – Multi-Byte Records have a mix of the above types

Resource Block Parameter List

Parameter	Index	Description	Type	Size	Store	Read / Write	Default
RESOURCE_BLOCK_2	0		DS-64	62		RO	
ST_REV	1	The revision level of the static data associated with the function block. To support tracking changes in static parameter attributes, the associated block's static revision parameter will be incremented each time a static parameter attribute value is changed. Also, the associated block's static revision parameter may be incremented if a static parameter attribute is written but the value is not changed.	Unsigned16	2	S	RO	
TAG_DESC	2	The user description of the intended application of the block.	Octet_String	32	S	R/W	
STRATEGY	3	The strategy field can be used to identify grouping of blocks.. This data is not checked or processed by the block.	Unsigned16	2	S	R/W	
ALERT_KEY	4	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.	Unsigned8	1	S	R/W	
MODE_BLK	5	The actual, target, permitted, and normal modes of the block.	DS-69	4	Mix	Mix	
BLOCK_ERR	6	This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.	Bit_String	2	D	RO	
RS_STATE	7	State of the function block application state machine.	Unsigned8	1	D	RO	
TEST_RW	8	Read/write test parameter - used only for conformance testing.	DS-85	112	D	R/W	
DD_RESOURCE	9	String identifying the tag of the resource which contains the Device Description for this resource.	Visible_String	32	S	RO	
MANUFAC_ID	10	Manufacturer identification number - used by an interface device to locate the DD file for the resource.	Unsigned32	4	S	RO	0x00004241 ASCII = BA
DEV_TYPE	11	Manufacturer's model number associated with the resource - used by interface devices to locate the DD file for the resource.	Unsigned16	2	S	RO	0x0488
DEV_REV	12	Manufacturer revision number associated with the resource - used by an interface device to locate the DD file for the resource.	Unsigned8	1	S	RO	0x01
DD_REV	13	Revision of the DD associated with the resource - used by an interface device to locate the DD file for the resource.	Unsigned8	1	S	RO	0x01
GRANT_DENY	14	Options for controlling access of host computer and local control panels to operating, tuning and alarm parameters of the block.	DS-70	2	S	R/W	
HARD_TYPES	15	The types of hardware available as channel numbers.	Bit_String	2	S	RO	
RESTART	16	Allows a manual restart to be initiated. Several degrees of restart are possible. They are 1: Run 2: Restart resource 3: Restart with defaults 4: Restart processor.	Unsigned8	1	D	R/W	
FEATURES	17	Used to show supported resource block options.	Bit_String	2	S	RO	0x000E
FEATURE_SEL	18	Used to select resource block options.	Bit_String	2	S	R/W	0x000E
CYCLE_TYPE	19	Identifies the block execution methods available for this resource.	Bit_String	2	S	RO	0x0003
CYCLE_SEL	20	Used to select the block execution method for this resource.	Bit_String	2	S	X	0x0003
MIN_CYCLE_T	21	Time duration of the shortest cycle interval of which the resource is capable.	Unsigned32	4	S	RO	0x12C0 = 4800
MEMORY_SIZE	22	Available configuration memory in the empty resource. To be checked before attempting a download.	Unsigned16	2	S	RO	0
NV_CYCLE_T	23	Minimum time interval specified by the manufacturer for writing copies of NV parameters to non-volatile memory. Zero means it will never be automatically copied. At the end of NV_CYCLE_TIME, only those parameters which have changed (as defined by the manufacturer) need to be updated in NVRAM	Unsigned32	4	S	RO	
FREE_SPACE	24	Percent of memory available for further configuration. Zero in a preconfigured resource.	Floating Point	4	D	RO	

Parameter	Index	Description	Type	Size	Store	Read / Write	Default
FREE_TIME	25	Percent of memory available for further configuration. Zero in a preconfigured resource.	Floating Point	4	D	RO	
SHED_RCAS	26	Time duration at which to give up on computer writes to function block RCas locations. Shed from RCas shall never happen when SHED_RCAS = 0.	Unsigned32	4	S	R/W	
SHED_ROUT	27	Time duration at which to give up on computer writes to function block ROut locations. Shed from Rout shall never happen when SHED_ROUT = 0.	Unsigned32	4	S	R/W	
FAULT_STATE	28	Condition set by loss of communication to an output block, fault promoted to an output block or a physical contact. When Fault State condition is set, Then output function blocks will perform their FSTATE actions.	Unsigned8	1	N	RO	
SET_FSTATE	29	Allows the Fault State condition to be manually initiated by selecting Set.	Unsigned8	1	D	R/W	
CLR_FSTATE	30	Writing a Clear to this parameter will clear the device fault state if the field condition, if any, has cleared.	Unsigned8	1	D	R/W	
MAX_NOTIFY	31	Maximum number of unconfirmed notify messages possible.	Unsigned8	1	S	RO	
LIM_NOTIFY	32	Maximum number of unconfirmed alert notify messages allowed.	Unsigned8	1	S	R/W	
CONFIRM_TIME	33	The time the resource will wait for confirmation of receipt of a report before trying again. Retry shall not happen when CONFIRM_TIME = 0.	Unsigned32	4	S	R/W	
WRITE_LOCK	34	If set, no writes from anywhere are allowed, except to clear WRITE_LOCK. Block inputs will continue to be updated.	Unsigned8	1	S	R/W	
UPDATE_EVT	35	This alert is generated by any change to the static data.	DS-73	14	D	RO	
BLOCK_ALM	36	The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active status in the Status attribute. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed.	DS-72	13	D	R/W	
ALARM_SUM	37	The current alert status, unacknowledged states, unreported states, and disabled states of the alarms associated with the function block.	DS-74	8	Mix	R/W	
ACK_OPTION	38	Selection of whether alarms associated with the block will be automatically acknowledged.	Bit_String	2	S	R/W	
WRITE_PRI	39	Priority of the alarm generated by clearing the write lock.	Unsigned8	1	S	R/W	
WRITE_ALM	40	This alert is generated if the write lock parameter is cleared.	DS-72	13	D	R/W	
ITK_VER	41	Major revision number of the interoperability test case used in certifying this device as interoperable. The format and range of the version number is defined and controlled by the Fieldbus FOUNDATION. Note: The value of this parameter will be zero (0) if the device has not been registered as interoperable by the FF.	Unsigned16	2	S	RO	4

IS Function Block Parameter List

Parameter	Index	Description	Type	Size	Store	Read / Write	Default
IS_BLOCK	0		DS-64	62		RO	
ST_REV	1	The revision level of the static data associated with the function block - incremented each time a static parameter attribute value is changed.	Unsigned16	2	S	RO	
TAG_DESC	2	The user description of the intended application of the block.	Octet_String	32	S	R/W	
STRATEGY	3	The strategy field can be used to identify grouping of blocks.. This data is not checked or processed by the block.	Unsigned16	2	S	R/W	
ALERT_KEY	4	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.	Unsigned8	1	S	R/W	
MODE_BLK	5	The actual, target, permitted, and normal modes of the block.	DS-69	4	Mix	Mix	
BLOCK_ERR	6	This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.	Bit_String	2	D	RO	
OUT	7		DS-65	5	N	R/W	
OUT_RANGE	8		DS-68	11	S	R/W	0-100%
GRANT_DENY	9		DS-70	2	S	R/W	
STATUS_OPTS	10		Bit_String	2	S	R/W	
IN_1	11	Assign to the first PV to be displayed	DS-65	5	N	R/W	0 + 0x1C
IN_2	12	Assign to the second PV to be displayed (Multiple variable versions only)	DS-65	5	N	R/W	0 + 0x1C
IN_3	13	Assign to the third PV to be displayed (Multiple variable versions only)	DS-65	5	N	R/W	0 + 0x1C
IN_4	14	Assign to the fourth PV to be displayed (Multiple variable versions only)	DS-65	5	N	R/W	0 + 0x1C
DISABLE_1	15	0 – Enable (Use Inout) 1 – Disable (NB Does not affect display)	DS-66	2	N	R/W	
DISABLE_2	16	0 – Enable (Use Inout) 1 – Disable (NB Does not affect display)	DS-66	2	N	R/W	
DISABLE_3	17	0 – Enable (Use Inout) 1 – Disable (NB Does not affect display)	DS-66	2	N	R/W	
DISABLE_4	18	0 – Enable (Use Inout) 1 – Disable (NB Does not affect display)	DS-66	2	N	R/W	
SELECT_TYPE	19	0 – Uninitialised 1 – First Good 2 – Min 3 – Max 4 – Mid 5 – Avg	Unsigned8	1	S	R/W	0
MIN_GOOD	20		Unsigned8	1	S	R/W	0
SELECTED	21		DS-66	2	D	R/W	
OP_SELECT	22		DS-66	2	N	R/W	
UPDATE_EVT	23	This alert is generated by any change to the static data.	DS-73	14	D	RO	
BLOCK_ALM	24	The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active status in the Status attribute. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed.	DS-72	13	D	R/W	
DISPLAY_CHANNEL (Only on BA444 Series - 8 Variable Indicator)	25		Unsigned8	1	S	RO	IS1:0 IS2:1

DISP8TB (Transducer Block) Parameter List

Parameter	Index	Description	Type	Size	Store	Read / Write	Default
DISP8TB	0		DS-64	62		RO	
ST_REV	1	The revision level of the static data associated with the function block - incremented each time a static parameter attribute value is changed.	Unsigned16	2	S	RO	
TAG_DESC	2	The user description of the intended application of the block.	Octet_String	32	S	R/W	
STRATEGY	3	The strategy field can be used to identify grouping of blocks.. This data is not checked or processed by the block.	Unsigned16	2	S	R/W	
ALERT_KEY	4	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.	Unsigned8	1	S	R/W	
MODE_BLK	5	The actual, target, permitted, and normal modes of the block.	DS-69	4	Mix	Mix	
BLOCK_ERR	6	This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.	Bit_String	2	D	RO	
UPDATE_EVT	7	This alert is generated by any change to the static data.	DS-73	14	D	RO	
BLOCK_ALM	8	The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active status in the Status attribute. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed.	DS-72	13	D	R/W	
TRANSDUCER_DIRECTORY	9		Array of unsigned32	4	N	RO	
TRANSDUCER_TYPE	10		Unsigned16	2	N	R/W	
XD_ERROR	11		Unsigned8	1	D	R/W	
COLLECTION_DIRECTORY	12		Array of unsigned32	4	N	RO	
IN_DATA_1	13		DS-BEKA-4	48	D	R/W	
IN_DATA_2	14		DS-BEKA-4	48	D	R/W	
IN_DATA_3	15		DS-BEKA-4	48	D	R/W	
IN_DATA_4	16		DS-BEKA-4	48	D	R/W	
IN_DATA_5	17		DS-BEKA-4	48	D	R/W	
IN_DATA_6	18		DS-BEKA-4	48	D	R/W	
IN_DATA_7	19		DS-BEKA-4	48	D	R/W	
IN_DATA_8	20		DS-BEKA-4	48	D	R/W	
INSTRUMENT TEMPERATURE	24		Floating_Point	4	D	RO	
CYCLIC_ON	25	00 – No Cyclic Data Transfer FF – Cyclic Data Transfer Occurring	Unsigned8	1	D	RO	

DISP8_IND_TB (Transducer Block) Parameter List

Parameter	Index	Description	Type	Size	Store	Read / Write	Default
DISP_8_INDTB	0		DS-64	62	S	R/O	
ST_REV	1	The revision level of the static data associated with the function block - incremented each time a static parameter attribute value is changed.	Unsigned16	2	S	R/O	
TAG_DESCR	2	The user description of the intended application of the block.	Octet String	S	S	R/W	
STRATEGY	3	The strategy field can be used to identify grouping of blocks.. This data is not checked or processed by the block.	Unsigned16	2	S	R/W	
ALERT_KEY	4	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.	Unsigned8	1	S	R/W	
MODE_BLK	5	The actual, target, permitted, and normal modes of the block.	DS-69	4	Mix	R/W	
BLOCK_ERR	6	This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.	Bit	D	D	R/O	
UPDATE_EVT	7	This alert is generated by any change to the static data.	DS-73	14	D	R/O	
BLOCK_ALM	8	The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active status in the Status attribute. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed.	DS-72	13	D		
TRANSDUCER_DIRECTORY	9		Unsigned16	2	N	R/O	
TRANSDUCER_TYPE	10		Unsigned16	2	N	R/O	
XD_ERROR	11		Unsigned8	1	S	R/O	
COLLECTION_DIRECTORY	12		Unsigned32	4	N	R/O	
FINAL_VALUE_1	13		DS-65	5	D	R/O	
FINAL_VALUE_2	14		DS-65	5	D	R/O	
FINAL_VALUE_3	15		DS-65	5	D	R/O	
FINAL_VALUE_4	16		DS-65	5	D	R/O	
FINAL_VALUE_5	17		DS-65	5	D	R/O	
FINAL_VALUE_6	18		DS-65	5	D	R/O	
FINAL_VALUE_7	19		DS-65	5	D	R/O	
FINAL_VALUE_8	20		DS-65	5	D	R/O	
IN_DATA_1	21		DS-BEKA-7	18	N	R/W	
IN_DATA_2	22		DS-BEKA-7	18	N	R/W	
IN_DATA_3	23		DS-BEKA-7	18	N	R/W	
IN_DATA_4	24		DS-BEKA-7	18	N	R/W	
IN_DATA_5	25		DS-BEKA-7	18	N	R/W	
IN_DATA_6	26		DS-BEKA-7	18	N	R/W	
IN_DATA_7	27		DS-BEKA-7	18	N	R/W	
IN_DATA_8	28		DS-BEKA-7	18	N	R/W	
INSTRUMENT_TEMPERATURE	29		Float	4	D	R/O	
LAST_VARIABLE	30		Unsigned8	1	N	R/W	

DISP1TB (Transducer Block) Parameter List

Parameter	Index	Description	Type	Size	Store	Read / Write	Default
DISP1TB	0		DS-64	62		RO	
ST_REV	1	The revision level of the static data associated with the function block - incremented each time a static parameter attribute value is changed.	Unsigned16	2	S	RO	
TAG_DESC	2	The user description of the intended application of the block.	Octet_String	32	S	R/W	
STRATEGY	3	The strategy field can be used to identify grouping of blocks.. This data is not checked or processed by the block.	Unsigned16	2	S	R/W	
ALERT_KEY	4	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.	Unsigned8	1	S	R/W	
MODE_BLK	5	The actual, target, permitted, and normal modes of the block.	DS-69	4	Mix	Mix	
BLOCK_ERR	6	This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.	Bit_String	2	D	RO	
UPDATE_EVT	7	This alert is generated by any change to the static data.	DS-73	14	D	RO	
BLOCK_ALM	8	The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active status in the Status attribute. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed.	DS-72	13	D	R/W	
TRANSDUCER_DIRECTORY	9		Array of unsigned32	4	N	RO	
TRANSDUCER_TYPE	10		Unsigned16	2	N	R/W	
XD_ERROR	11		Unsigned8	1	D	R/W	
COLLECTION_DIRECTORY	12		Array of unsigned32	4	N	RO	
BARGRAPH	13	0 – Bargraph Disabled 1 – Left Align 2 – Centre Align 3 – Right Align	Unsigned8	1	N	R/W	1
BARGRAPH_MIN	14		Floating_Point	4	N	R/W	0.0
BARGRAPH_MAX	15		Floating_Point	4	N	R/W	100.0
DISP_FORMAT	16		Unsigned8	1	N	R/W	2
ZERO_OFFSET	17		Floating_Point	4	N	R/W	0.0
GAIN_FACTOR	18		Floating_Point	4	N	R/W	1.0
IN_DATA	19		DS-65	5	D	R/W	
INSTRUMENT TEMPERATURE	20		Floating_Point	4	D	RO	
CYCLIC_ON	21	00 – No Cyclic Data Transfer FF – Cyclic Data Transfer Occurring	Unsigned8	1	D	RO	

Appendix B

Troubleshooting

What version do I have?

Single Variable Versions:

The version number can be seen during the unit power-up cycle. At power up the unit will first turn all the LCD segments on. It will then display the model number without options i.e. BA414 and following this it will display FFx.xx where x.xx is the firmware version.

Multiple Variable Versions:

There are two methods to identify the version of product that you have. The first is to watch the splash screen on power up and note the SW number at the bottom of the screen. The second is to enter the configuration menu, scroll down to User Info. This screen gives the model number and the software version. On the Version 2 and later Firmware, the device revision is also displayed.

How Do I reset it to Factory Defaults?

This should be carried out with great care and must not be performed on a live production fieldbus system. The unit must be powered up while the following sequence is performed:

Single Variable Versions:

- Field Mounting D-Type. Remove the key cover. Insert little finger through the hole and up towards the LCD display. The reset button can be felt in the middle of the opening. Press the reset button and hold until the LCD screen shows all segments. The button can then be released and the unit reassembled.
- Panel Mounting C-Type. Remove the rear panel of the instrument. The reset button can be seen at the bottom in the middle of the main PCB. Press the reset button and hold until the LCD screen shows all segments. The button can then be released and the unit reassembled.
  Warning :The BA41x units are Intrinsically Safe; Care must be taken to ensure no metal gets into the display during this procedure and that no components are damaged.

Multiple Variable Versions:

- The display can be reset using the main configuration menu. Please refer to the instruction manual for full details.

Why Does the unit remain Out of Service?

The usual reason for this is that the IS function block ***SELECT_TYPE*** parameter has not been set up. Select a type of "**`FIRST GOOD`**" and the display should function as intended.

How Do I Set the Bar Graph Up?

The bar graph can be set up using the DISP1TB Transducer block which can be accessed via the Host Fieldbus system. There are no configuration switches on this unit.

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