

AUTROFIELDBUS PROTOCOL CONVERTER BSD-321/1

AutoSafe Interactive Fire Detection System Product Datasheet

Features

- Interfaces various types of flame and gas detectors with the AutoSafe Integrated Fire and Gas Detection System
- Distributed access to Loop Driver Modules via AFB
- The AutoFieldBus address and protocol type are easily defined by means of switches
- RS-485 /RS422 connection to detectors
- RS-232 AL_Com+ connection to IOModules
- Built-in protocol converters
- Trending and maintenance facilities
- Rail mounted
- Approved by FM
- Option for local earth fault monitoring of RS-485/422
- Prepared for dual earth systems (IE+PE)



Description/Application

BSD-321/1 is a serial interface used to communicate with different types of detectors and the I/O stack.

BSD-321/1 contains a protocol converter for the specific type of detector to be interfaced. All events such as alarms, prealarms and fault warnings are transmitted to the AutoSafe Integrated Fire and Gas Detection System.

Depending on the specific detector, analogue readings of gas concentration, for example, are also transmitted for trending and maintenance purposes.

The I/O stack can be used as an ordinary I/O stack connected in the panel.

The built-in short-circuit isolator of AutoFieldBus will, together with the ring topology, ensure that neither a single short-circuit nor a wire break will cause loss of functionality.

Furthermore, the BSD-321/1 provides optional AutoFieldBus earth fault detection.

The BSD-321 basic model has RS485 /RS232 communication ports for interfacing field equipment.

There can be a maximum of 30 BSD-321 units on each AutoFieldBus ring inclusive BPS405/BPS410.



This product contains static-sensitive devices.

Always use an antistatic wrist strap / earth bracelet to avoid any electrostatic discharge.

Product Name	Part number	Description
BSD-321/1	116-BSD-321/1	AUTROFIELDBUS Protocol Converter

Technical specifications	
Dimensions (mm)	114,5 x 120 x 45
Weight (g)	250 g
Housing material	Polyamide 6.6.
Mounting	DIN TS-35 rail
Power supply	18-32VDC
Current consumption	Typically 150-200 mA at 24VDC
Temperature range	-10 to +60 °C
Storage temperature range	- 40 to +85 °C
Humidity	10% - 95% RH (non-condensing)
Degree of protection	IP 20
Approvals	FM Approval
Interface to detectors	Four-wire RS-422 Two-wire multidrop RS485
Communication loop	AutoFieldBus
Cable terminals	Phoenix Combicon style Maximum 2.5 mm ² wires
Cable AutoFieldBus	Refer to specification for AutoSafe
Cable RS485	Twisted pair, shielded cable Maximum 100Ω characteristic impedance Maximum total length 1200m Maximum cable capacitance 150 nF
Debug and download connector	MTA-style, cable XJA-029

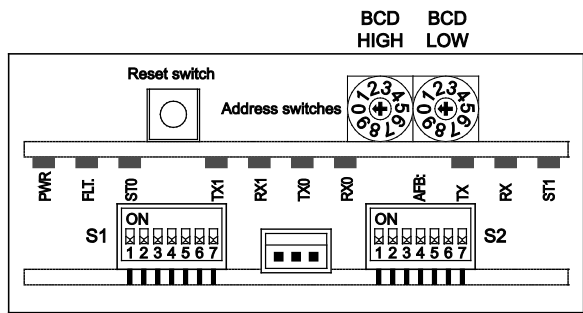
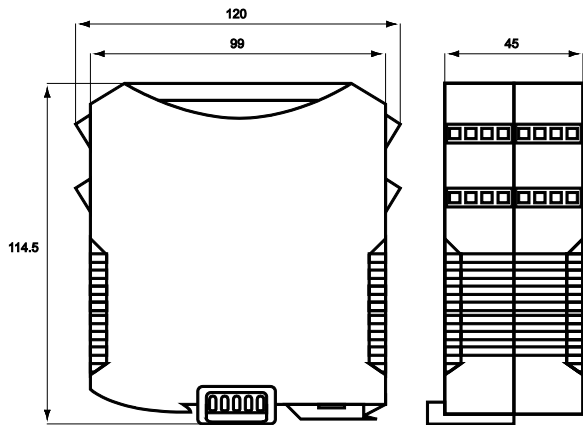
Protocol Type and Switch Setting

The AutoFieldBus address and type of protocol/detector are defined by on-board rotary switches.

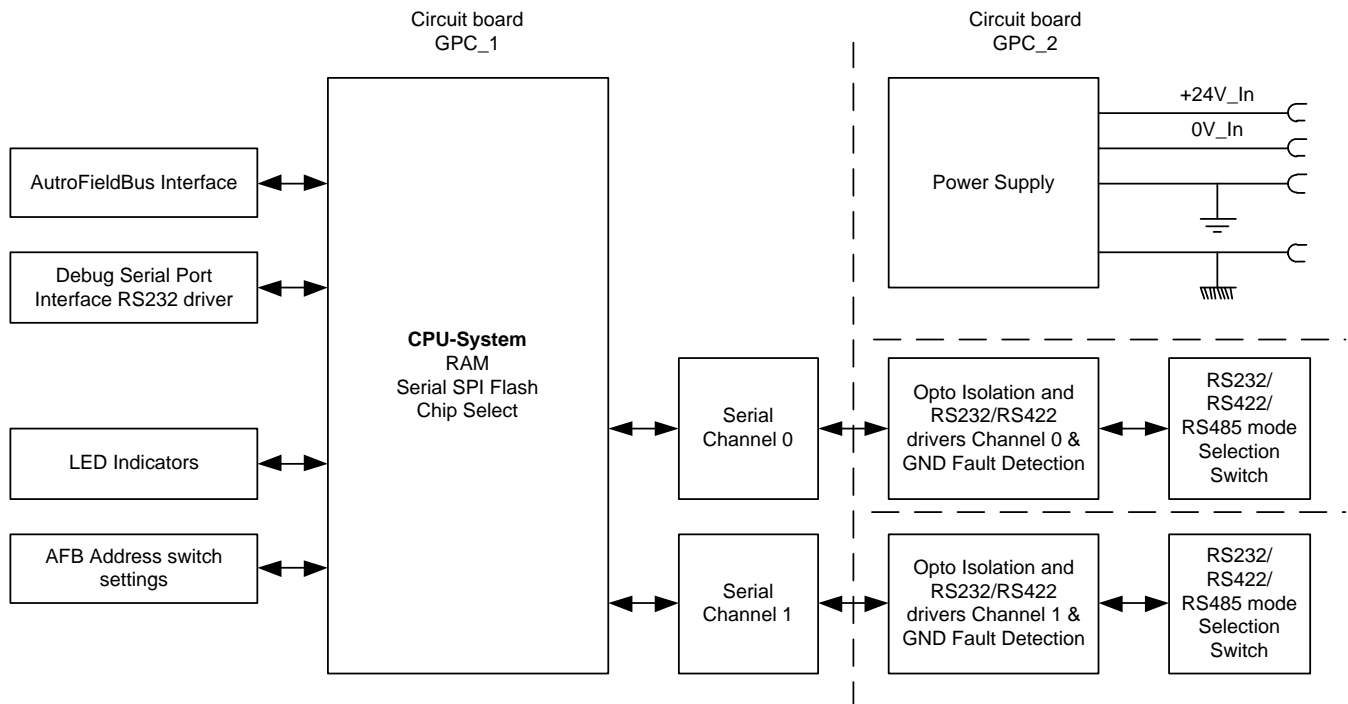
Protocol type	Switch setting 1)	Max no of units/ BSD-321
AI_Com+	70	24
SafeEye OPGD	71	16
MicroPack CCTV	72	27
Kidde Fenwal	73	16

1) To select protocol type: Set address switches according to table, then press reset button. After choosing protocol set the address switches to the actual address in the range of 1-30 and press reset button.

Layout / Dimensions

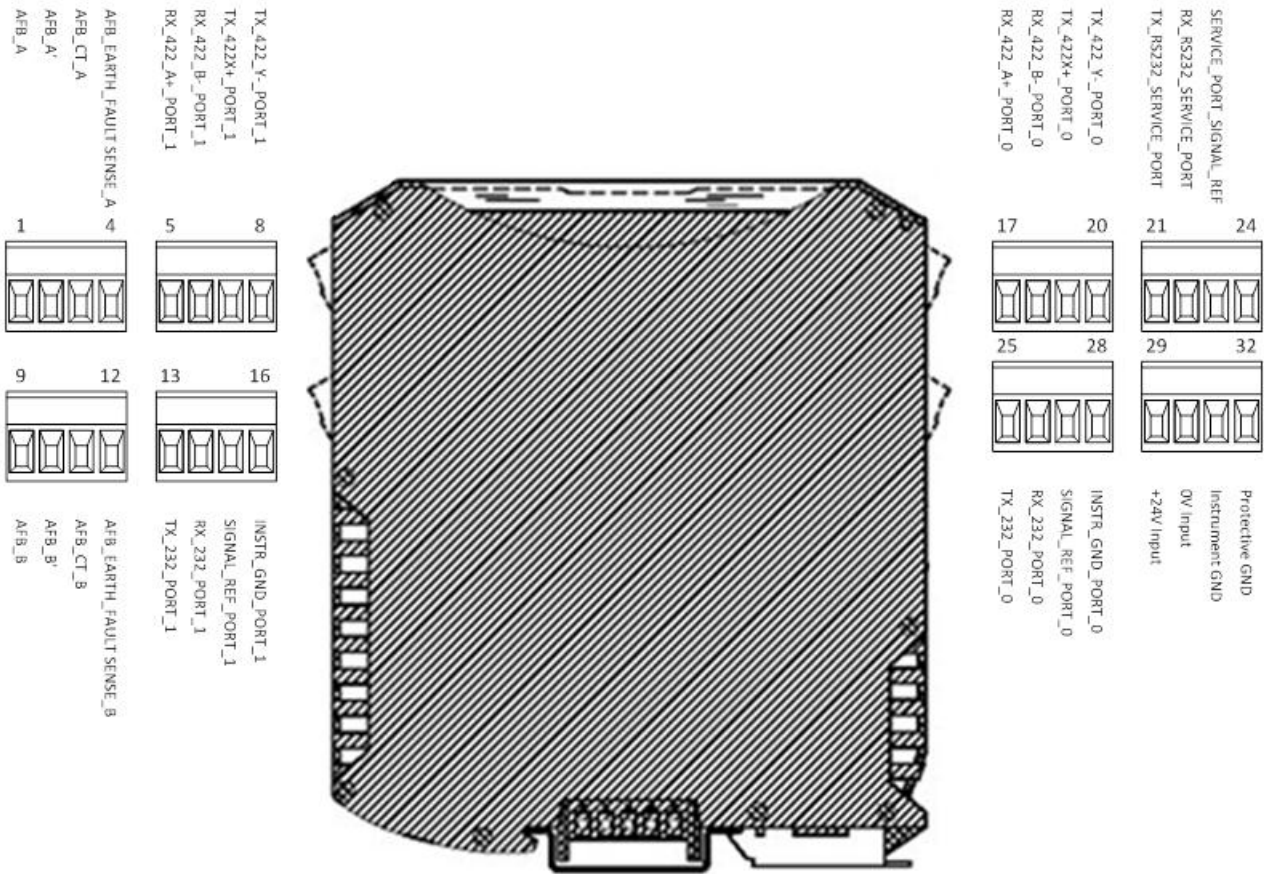


Block Diagram



Connectors

All connections are made to plug-in screw terminals numbered 1-32.



Terminal	Function
1	AutoFieldBus A
2	AutoFieldBus A'
3	AutoFieldBus CT A
4	AutoFieldBus Earth Fault Sense
5	RX RS422_A+ Port 1
6	RX RS422_B- Port 1
7	TX RS422_X+ Port 1
8	TX RS422_Z- Port 1
9	AutoFieldBus B
10	AutoFieldBus B'
11	AutoFieldBus CT B
12	AutoFieldBus Earth Fault Sense
13	TX RS232 Port 1
14	RX RS232 Port 1
15	Signal Reference Port 1
16	Instrument Earth Port 1

Terminal	Function
17	RX RS422_A+ Port 0
18	RX RS422_B- Port 0
19	TX RS422_X+ Port 0
20	TX RS422_Z- Port 0
21	TX RS232 Service port
22	RX RS232 Service port
23	RS232 Service port Signal Reference
24	No connection
25	TX RS232 Port 0
26	RX RS232 Port 0
27	Signal Reference Port 0
28	Instrument Earth Port 0
29	+24V Input
30	0V Input
31	Instrument Earth Common
32	Protective Earth Common

LED Indicators

PWR	green	Power & Heartbeat
FLT	red	BSD-321 Fault
ST0	yellow	AFB Message processed
TX1	green	Port 1 Transmits
RX1	red	Port 1 Receives
TX0	green	Port 0 Transmits
RX0	red	Port 0 Receives
TX	green	AFB Transmits
RX	red	AFB bus traffic
ST1	yellow	AFB Message received

General DIP switch settings for all applications:

S1:			
	RS422/485	RS232	
1	ON	OFF	DC bias of RS422 RX Port 0
2	(*)	OFF	Enable RS422 RX Earth Fault sensor Port 0
3	ON	OFF	Enable RS-422 RX Port 0
4	OFF	ON	Enable RS-232 RX Port 0
5	ON	OFF	Enable RS-485 Port 0
6	ON	OFF	120Ω EOL resistor of RS-422 RX Port 0
7	OFF	OFF	120Ω EOL resistor of RS-422 TX Port 0
S2:			
	RS422/485	RS232	
1	OFF	OFF	DC bias of RS422 TX Port 0
2	(*)	OFF	Enable RS422 TX Earth Fault sensor Port 0
3	ON	OFF	Enable RS-422 RX Port 1
4	OFF	ON	Enable RS-232 RX Port 1
5	ON	OFF	Enable RS-485 Port 1
6	(**)	OFF	120Ω EOL resistor of RS-422 RX Port 1
7	OFF	OFF	120Ω EOL resistor of RS-422 TX Port 1

(*)
 Earth fault detection on the RS-485 bus
 Earth fault detection is enabled on the RS-485 link by when S2-2 is ON. The monitoring circuit monitors unintended connection between the A+ wire (connector 17) and the port 0 ref wire (connector 28), or between the B- wire (connector 18) and the port 0 ref wire (connector 28).

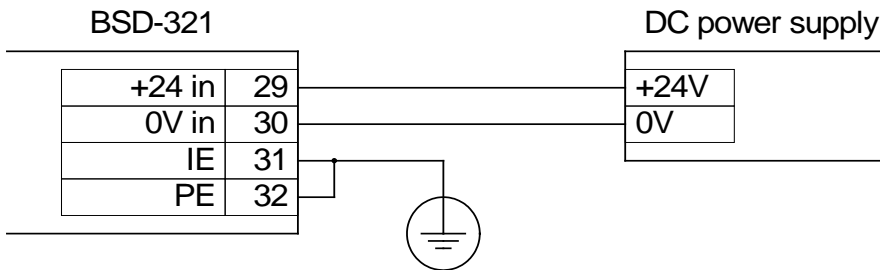
(**) Local loop-back:
 • Set S2-6 OFF (Disable EOL resistor for port 1)
 • The detector at the other end of the RS-485 bus must enable its EOL resistor

Remote loop-back:
 • Set S2-6 ON (Enable EOL resistor for port 1)

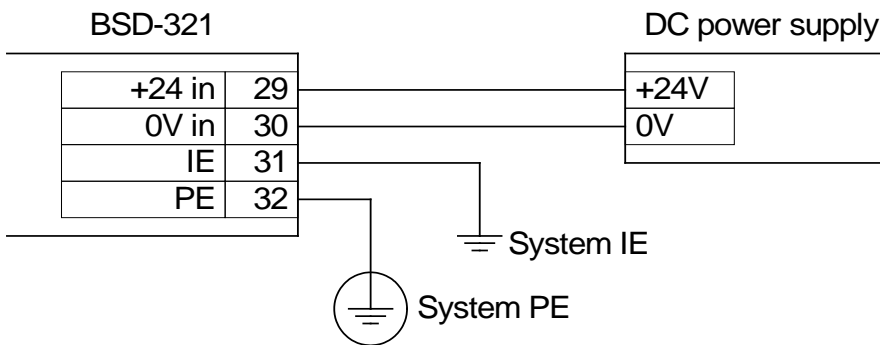
- None of the detectors must have EOL resistors

The BSD-321/1 is intended for use with 24VDC power supplies. It may be used in single or dual earth systems.

BSD-321 power,
Single earth system



BSD-321 power,
Dual earth system



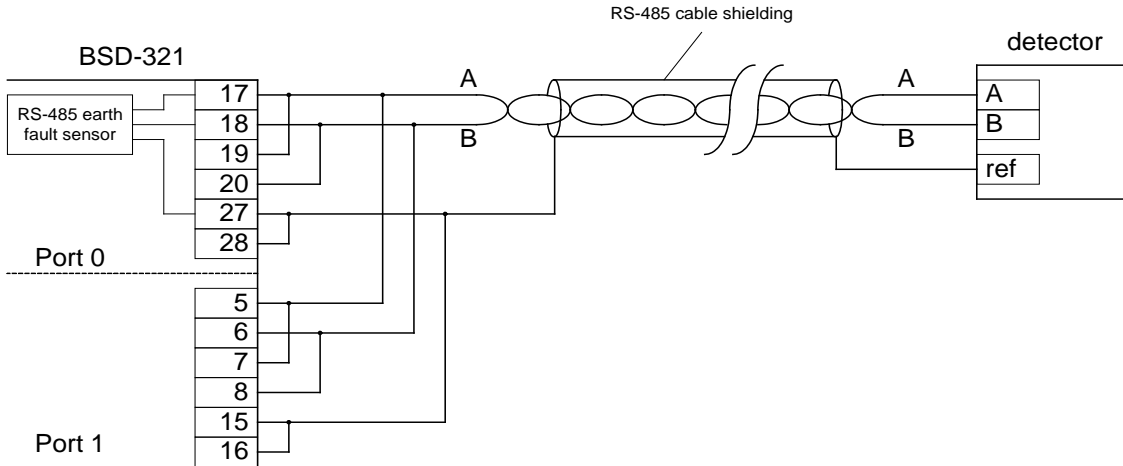
For further earth & shielding information reference to the System Design and Engineering, AutoSafe IFG.
Part number: 116-P-SYSDEENGIN002DIFG/XGB

Obtaining RS-485 using the BSD-321 RS-422 connections

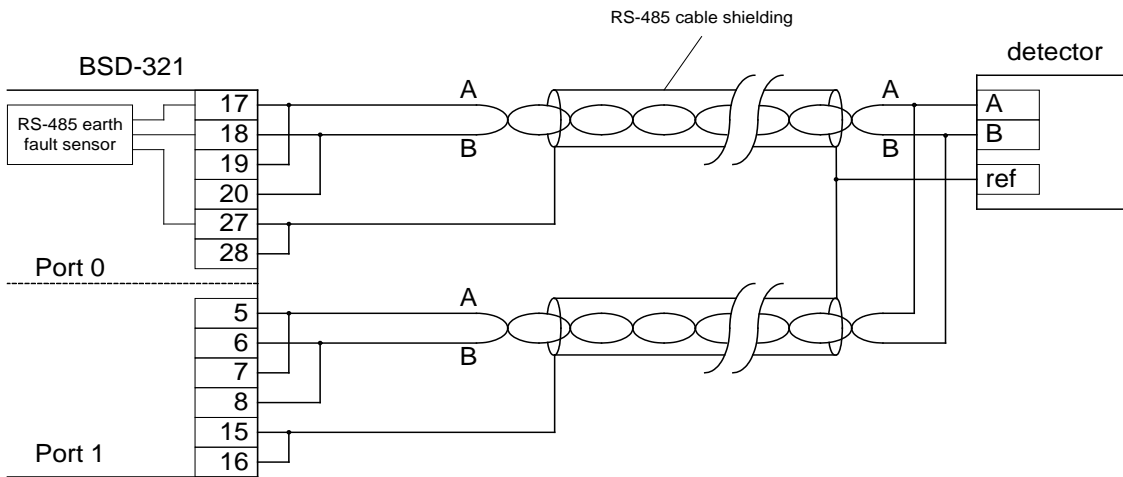
RS-485 is obtained by connecting the BSD-321 RS-422 ports in RS-485 mode. This is done by connecting the A+ and the X+ signal together, and the B- and the Y- signal. The resulting RS-485 signal names will be A+ and B-

RS-485 Detector interface with loop-back

RS-485 branch connection (local loop-back):



RS-485 loop connection (remote loop-back):



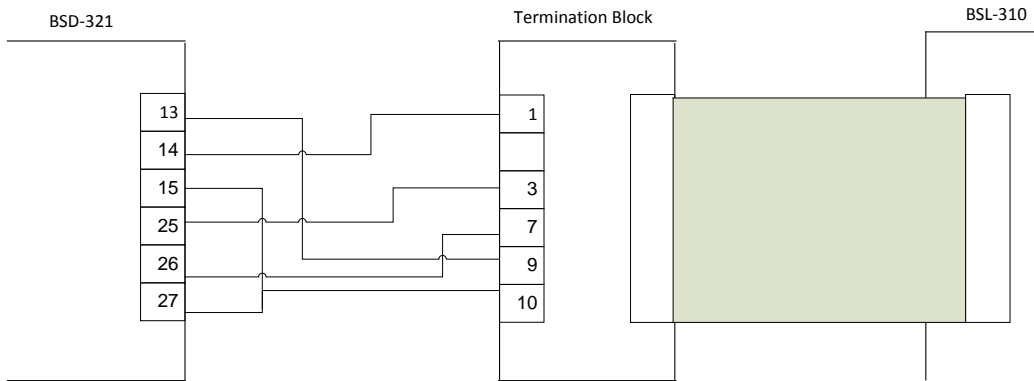
Loop-back of RS-485 can be done either locally on BSD-321/1 or remotely with loop to/from detector.

When not used with I/O stack the BSD-321/1 requires a RS-485 loop-back connection. Loop-back is used to give increased system safety. The extra port verifies the communication path. This also opens the option to using RS-485 loop connection for dual communication paths to the detectors.

Loop-back for optimum safety is required for SIL2 applications.

Switches S1 and S2 must be set according to table.

RS-232 BSL-310 interface



BSD-321/1		BSL-310 Block	
#	Description	Description	#
13	TX RS 232 Port 1	CTS	9
14	RX RS232 Port 1	INT	1
15	Signal Reference Port 1	RS-GND	10
25	TX RS 232 Port 0	TX	3
26	RX RS232 Port 0	RX	7
27	Signal Reference Port 0	RS-GND	10

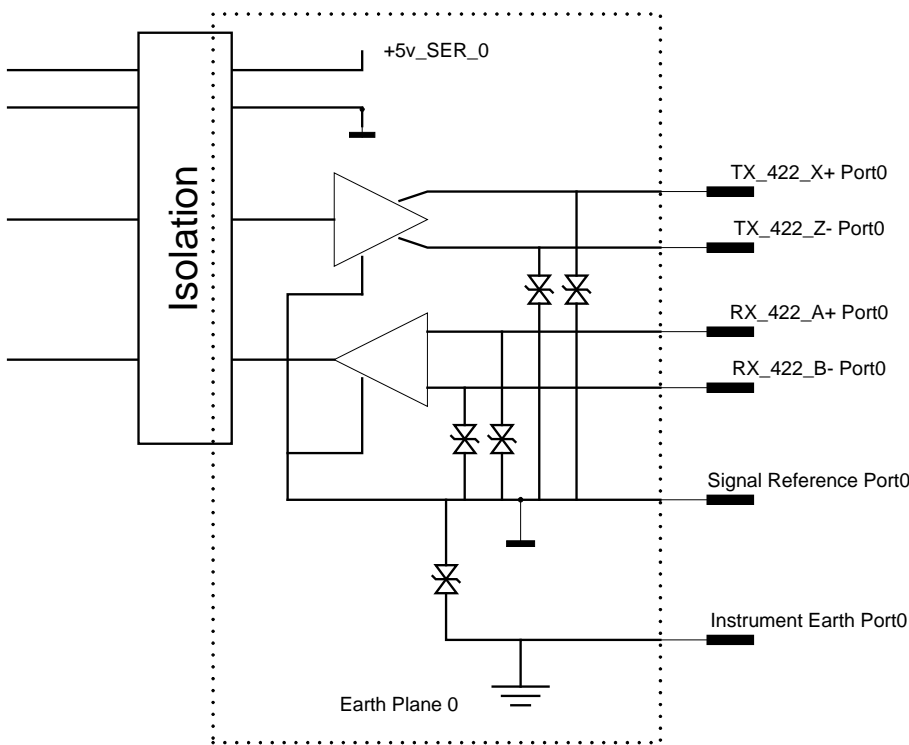
The "ref" signal on the detector when not used with I/O stack

The ref signal on the detector is the detectors "common" signal for the RS-485. This signal may be connected to IE (or earth in single earth systems), to the detectors power supply 0V or it may be isolated (floating).

All detectors on the same RS-485 bus must have the same reference, and this reference shall be the connections to BSD-321/1's reference. Both RS-485 ports are isolated to allow a floating reference.

It is essential that the connection to the RS-485 shield be done only in one point in the system if the detectors are not 100% isolated from each other (individual isolated detector power supplies and no earth reference).

Schematic of port equivalent:

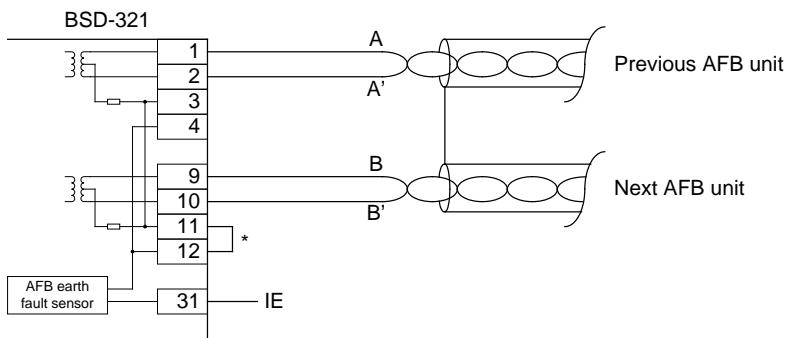


Earth fault detection on AutroFieldBus

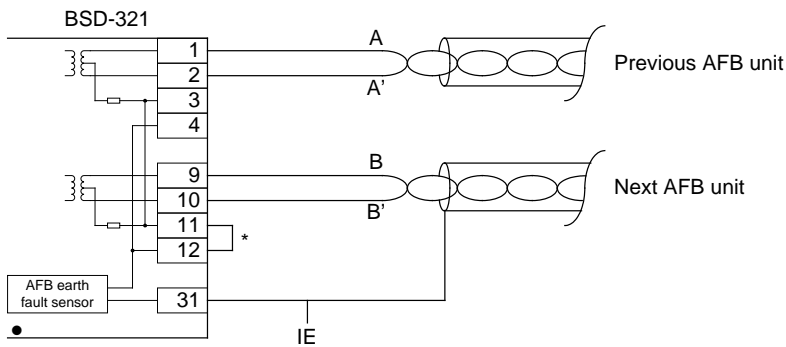
Earth fault detection is enabled on the AutroFieldBus (AFB) interface. Note that Earth fault detection can only be enabled on one unit on each cable segment on AFB. Cable segments are isolated by using fibre modems (BSL-321/322) or boosters (BSL-325).

In systems with only one cable segment the AFB earth fault detection shall be done by the EAU-341 unit. Earth fault detection requires a connection between connector 11 and 12, and at the same time the IE connector is connected to the same earth system that an optional cable shielding is connected to.

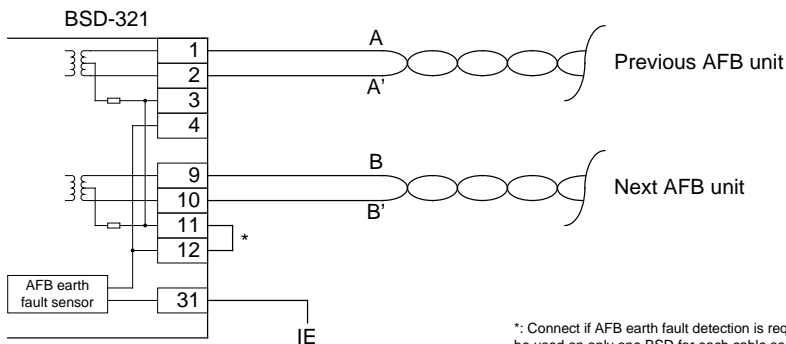
AFB cable with continuous shield



AFB cable with discontinuous shield



AFB cable without shield



*: Connect if AFB earth fault detection is required. This feature should be used on only one BSD for each cable segment. Detection will be done towards the IE terminal (31)