

Declaration of conformity and instructions

Features

- Interfaces various types of flame and gas detectors with the AutoSafe Integrated Fire and Gas Detection System
- The AUTROFIELDBUS address and protocol type are easily defined by means of switches
- RS-485 connection to detectors
- Built-in protocol converters
- Trending and maintenance facilities
- Approved by NEMKO
- EEx de version for mounting in hazardous areas: zone 1 and 2

Application / Description

The BSD-321/EX can be configured to interface various types of detectors into the AutoSafe Integrated Fire and Gas Detection System.

BSD-321/EX 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 built-in short-circuit isolator of AUTROFIELDBUS 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/EX provides optional AUTROFIELDBUS earth fault detection.

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

There can be a maximum of 31 BSD-321/EX units on each AUTROFIELDBUS ring.



Overview Protocol Type and Interface Switches Settings

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

Type of interface	Switch setting 1)	Max no of units/ BSD-321
AutoPath Pulsar, Open Path Gas Detector	70	16
SafeEye series 200/300, Open Path Gas Detector	71	16
AutoFlame CCTV Flame Detector and Video Switches	72	27 camera 2 video switches
Kidde Fenwal AnaLaser II HSSD	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 1-31.



Technical Specifications

Weight (g)	
Housing material	Stainless steel SS 316L
Mounting	Wall bracket
Power supply	18-32VDC
Current consumption	Typically 150-200 mA at 24VDC
Temperature range	-20 to +65 °C (T5) -20 to +70 °C (T6)
Humidity	10% - 95%
Degree of protection	IP 66, IP 67
Approvals	CE, CENELEC EX
Interface to detectors	Two-wire multidrop RS485
Communication loop	AUTROFIELDBUS
Cable terminals	
Cable AUTROFIELDBUS	Refer to specification for AutoSafe
Cable RS485	Twisted pair, shielded cable Maximum 100Ω resistive loss Maximum total length 1200m Maximum cable capacitance 150 nF
Debug and download connector	MTA-style, cable XJA-029
Notified body	NEMKO-Oslo-Norway ID No. 0470
EC-type examination certificate	NEMKO 05ATEX1074
Directives and standards	94/9EC (ATEX) EN 50014 EN 50018 EN 50019 89/336/EEC (EMC) Emission: EN 50081-1:1992 Immunity: EN 50130-4: 1995 EN 61000-6-2:2001 EN 61000-6-3:2001 EN 61000-6-4:2001 EN 60945:2002 IEC 6533, ed.2 EN 54-2:1997 EN 54-2:1997 EN 54-2:1997 IACS E10:2001
Ex parameters	II 2 G EEx de T5-T6 IIC

Order Numbers

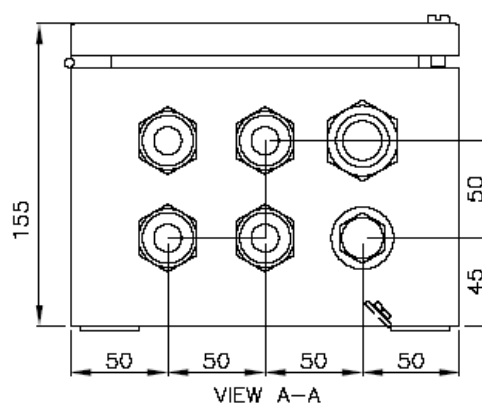
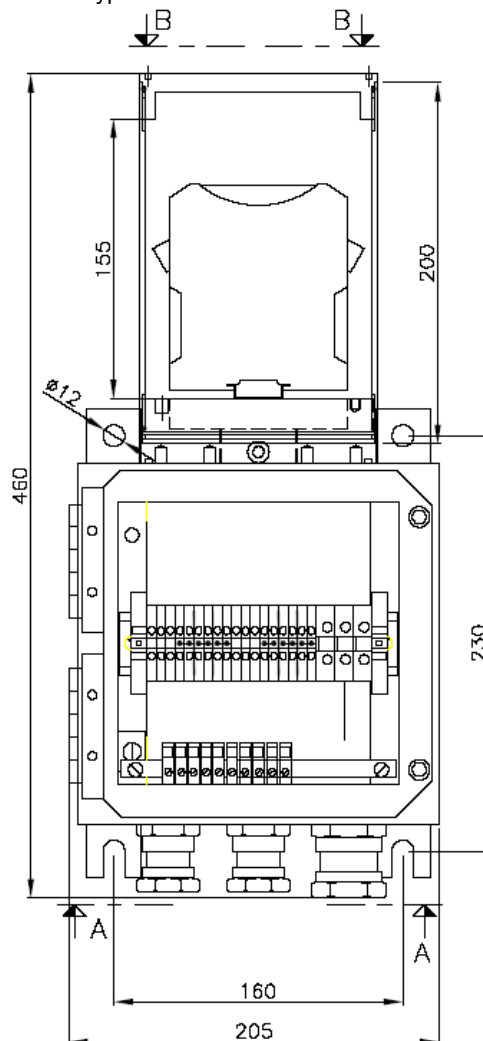
Order number	Description
116-BSD-321/EX	AUTROFIELDBUS Protocol Converter for hazardous areas

Optional

Order number	Description
116-BSD-321/1	AUTROFIELDBUS Protocol Converter spare part
Gland M25, EEXe	66571-071.2500
Gland M20, EEXe	66571-071.2000
116-6370-008.0030	O-RING NBR70 120,32X2,62MM

Connections / Dimensions / Mounting

Removal of top cover is recommended done by oil filter wrench type tool.



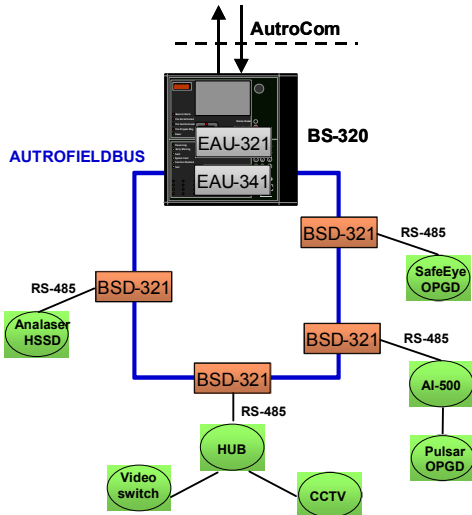
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Overview – Typical Installation



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

RS-485 is pre connected on the BSD-321/EX by the connection of the BSD-321 RS-422 ports in RS-485 mode. This has been done by connecting the A+ and the X+ signal together, and the B- and the Y-signal. The resulting RS-485 signal names are therefore A+ and B-.

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

Termination

The BSD-321/EX has fixed terminal blocks.

Terminal	Term size	Function
1	4 mm ²	AutroFieldBus A
2	4 mm ²	AutroFieldBus A'
3	4 mm ²	Cable screen
4	4 mm ²	RS485_A+ Port 1
5	4 mm ²	RS485_A+ Port 1
6	4 mm ²	RS485_B- Port 1
7	4 mm ²	RS485_B- Port 1
8	4 mm ²	Signal reference port 1 (Cable screen)
9	4 mm ²	Signal reference port 1 (Cable screen)
10	4 mm ²	AutroFieldBus B
11	4 mm ²	AutroFieldBus B'
12	4 mm ²	Cable screen
13	4 mm ²	RS485_A+ Port 0
14	4 mm ²	RS485_A+ Port 0
15	4 mm ²	RS485_B- Port 0
16	4 mm ²	RS485_B- Port 0
17	4 mm ²	Signal reference port 0 (Cable screen)
18	4 mm ²	Signal reference port 0 (Cable screen)
19	10 mm ²	+24V Input
20	10 mm ²	0V Input
21	10 mm ²	Instrument Earth Common
	4 mm ²	10 x PE on earth bar

General DIPswitch settings for all applications:

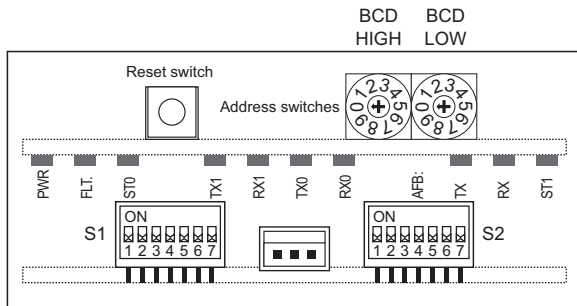
S1:

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

S2:

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

(*): Refer to text for switch position



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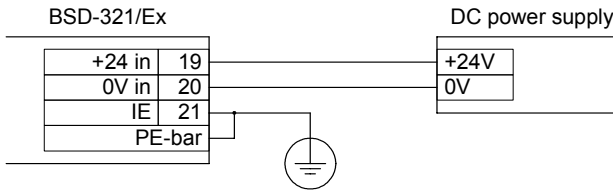
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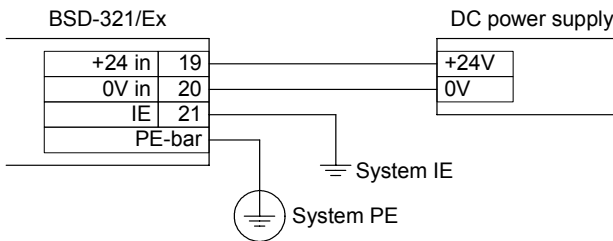
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The BSD-321 is intended for use with 24VDC power supplies. It may be used in single or dual earth systems.

BSD-321/Ex power,
Single earth system



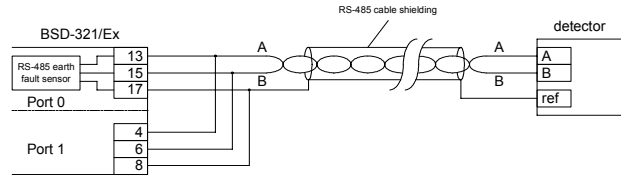
BSD-321/Ex power,
Dual earth system



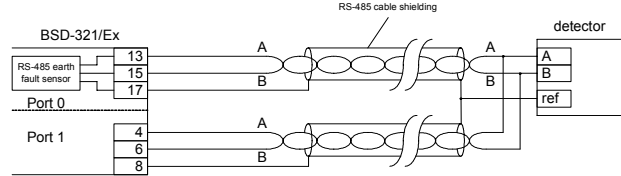
For further earth & shielding information reference to the System Description AutoSafe IFG.
Order number: 116-P-ASAFE-IFG/XE.

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 or remotely with loop to/from detector.

The BSD-321 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 (To be approved).

Switches S1 and S2 must be set accordingly for correct termination.

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

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 (internal connector 17) and the port 0 ref wire (connector 28), or between the B- wire (internal connector 18) and the port 0 ref wire (internal connector 28).

The "ref" signal on the detector

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).

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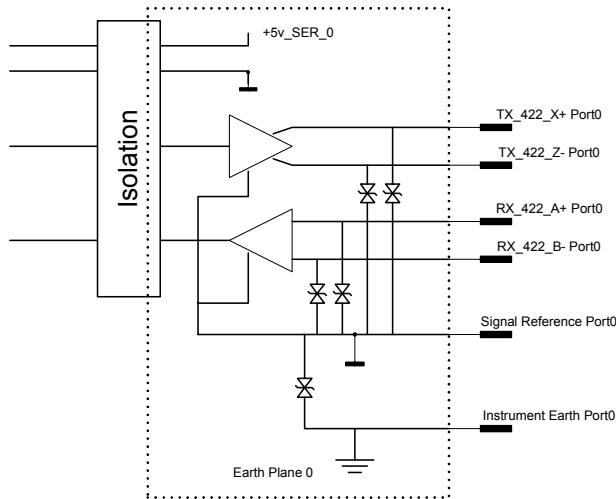
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All detectors on the same RS-485 bus must have the same reference, and this reference shall be the connections to BSD-321/Ex's reference. Both RS-485 ports are isolated to allow a floating reference.

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).

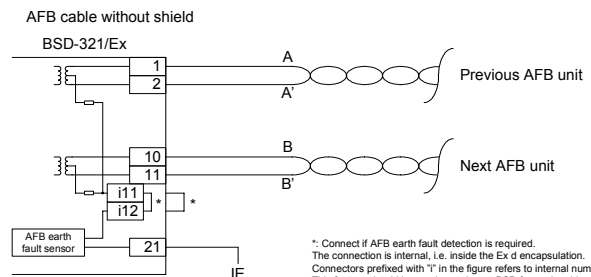
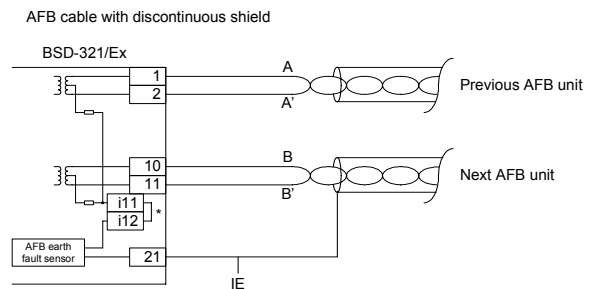
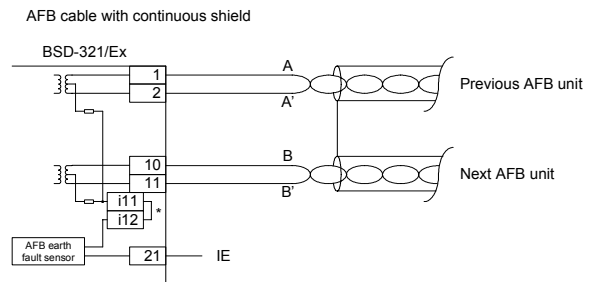
Schematic of port equivalent:



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 internal connectors 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.



*: Connect if AFB earth fault detection is required. The connection is internal, i.e. inside the Ex d encapsulation. Connectors prefixed with "i" in the figure refers to internal numbering. This feature should be used on only one BSD for each cable segment. Detection will be done towards the IE terminal

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Handling

Due to the weight and nature of the enclosure precautions have to be taken to avoid damages to the equipment and the individual. The Exd enclosure flamepaths must be securely protected to avoid damage.

Installation / Dismantling

When mounting the enclosure ensure that the mounting support is able to take the full weight of the enclosure. If any twisting or bending of the enclosure bracket is likely, use washers or packing plates as necessary between the mounting support and the bracket before the screws or nuts are tightened. When connecting cables, ensure the incoming cables/wires are isolated from power sources. Ensure that the glands used are securely tightened and that they are approved according to ATEX. Thereafter connect the internal (alt. External) earth connections. Tighten the compression nut on the glands used. All other openings to be blinded using an ex (ATEX) approved blind plug. When removing the enclosure, the same precautions apply as those observed when mounting the enclosure.

Inspection / Maintenance

This enclosure is made of acid-resistant stainless steel and thereof not subject to corrosion. We recommend that maintenance is performed in accordance with the IEC 60079-17/60079-1 standards. If the enclosure needs to be opened, proceed as follow:

1. Disconnect the power source.
2. Unscrew the external fixing screw on the exd-part.
3. Clean and inspect the threads (flamepath) on the bottom part and inside the tube.
4. Inspect the o-ring on the bottom part, we recommend that this o-ring is replaced upon every opening of the enclosure, note new o-ring to be purchased by Autronica.
5. Before assembly the o-ring and threads to be protected with copper grease or other approved greases.
6. Connect the tube to the bottom part and assure that the unbrako fixing screw is firmly tightened.

If any damage is found, the enclosure should be put out of service and the manufacturer contacted.

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