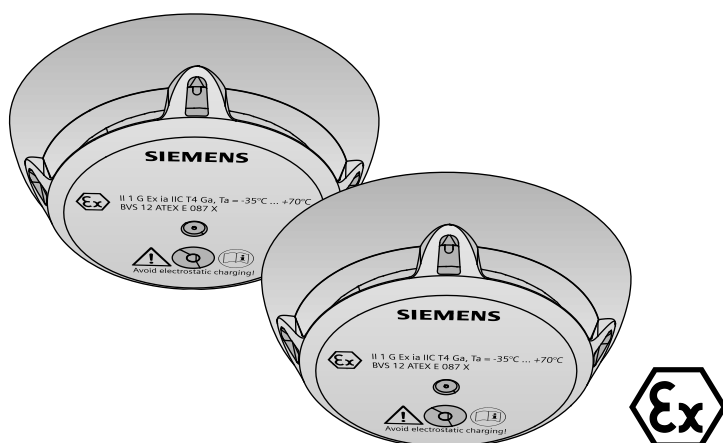


SIEMENS



**Modernizing fire detection
installations with multiple
protocol detectors in areas at
risk of explosion**

Technical Manual

Legal notice

Technical specifications and availability subject to change without notice.

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1 About this document

Goal and purpose

This document only contains information about modernizing existing collective Ex detector lines with the following multiple protocol detectors:

- Neural fire detector FDOOT241-A9-Ex
- Neural fire detector OOH740-A9-Ex

This document does not cover the process of planning new detector lines in areas at risk of explosion. Please refer to document A6V10324618 for information on this.

You will find details on the individual multiple protocol detectors, such as technical data, in the following documents:

Multiple protocol detectors	Technical manual
FDOOT241-A9-Ex	A6V10346580
OOH740-A9-Ex	A6V10367521

See chapter 'Applicable documents [→ 8]'.
 Following the instructions consistently will ensure that the product can be used safely and without any problems.

Target groups

The information in this document is intended for the following target groups:

Target group	Activity	Qualification
Product Manager	<ul style="list-style-type: none"> ● Is responsible for information passing between the manufacturer and regional company. ● Coordinates the flow of information between the individual groups of people involved in a project. 	<ul style="list-style-type: none"> ● Has obtained suitable specialist training for the function and for the products. ● Has attended the training courses for Product Managers.
Project Manager	<ul style="list-style-type: none"> ● Coordinates the deployment of all persons and resources involved in the project according to schedule. ● Provides the information required to run the project. 	<ul style="list-style-type: none"> ● Has obtained suitable specialist training for the function and for the products. ● Has attended the training courses for Project Managers.
Installation personnel	<ul style="list-style-type: none"> ● Assembles and installs the product components at the place of installation. ● Carries out a performance check following installation. 	<ul style="list-style-type: none"> ● Has received specialist training in the area of building installation technology or electrical installations.
Commissioning personnel	<ul style="list-style-type: none"> ● Configure the product at the place of installation according to customer-specific requirements. ● Check the product operability and release the product for use by the operator. ● Searches for and corrects malfunctions. 	<ul style="list-style-type: none"> ● Has obtained suitable specialist training for the function and for the products. ● Has attended the training courses for commissioning personnel.
Maintenance personnel	<ul style="list-style-type: none"> ● Carries out all maintenance work. ● Checks that the products are in perfect working order. ● Searches for and corrects malfunctions. 	<ul style="list-style-type: none"> ● Has obtained suitable specialist training for the function and for the products.

Reference document and source language

- The source language of this document is German (de).
- The reference version of this document is the international version in English. The international version is not localized.

The reference document has the following designation:

ID_x_en_--

x = version, en = English, -- = international

Document identification

The document ID is structured as follows:

ID code	Examples
ID_ModificationIndex_Language_COUNTRY -- = multilingual or international	A6V10215123_a_de_DE A6V10215123_a_en_-- A6V10315123_a_--_--

Date format

The date format in the document corresponds to the recommendation of international standard ISO 8601 (format YYYY-MM-DD).

Conventions for text marking

Markups

Special markups are shown in this document as follows:

▷	Requirement for a behavior instruction
1. 2.	Behavior instruction with at least two operation sequences
–	Version, option, or detailed information for a behavior instruction
⇒	Intermediate result of a behavior instruction
⇨	End result of a behavior instruction
•	Numbered lists and behavior instructions with an operation sequence
[→ X]	Reference to a page number
'Text'	Quotation, reproduced identically
<Key>	Identification of keys

Supplementary information and tips



The 'i' symbol identifies supplementary information and tips for an easier way of working.

1.1 Technical terms

Term	Explanation
EMC	Electromagnetic compatibility
EOL	End-of-Line
ES	Product version
Intrinsically safe	Circuit in which the electrical values are limited to such an extent that there can be no source of ignition which could lead to an explosion. The conditions for intrinsic safety are defined in EN 60079-11.
FDnet/C-NET	Addressed detector line
FDnet-Ex/C-NET-Ex	Addressed, intrinsically safe detector line in the area at risk of explosion
GMT	Limit value detection technology
Collective detector line	Unaddressed detector line
Collective Ex detector line	Non-addressed, intrinsically safe detector line in the area at risk of explosion

1.2 Applicable documents

Document ID	Title
001204	Principles, applications, installation, maintenance Fire alarm signal in areas at risk of explosion
001508	Guidelines Connection factors, line resistances and capacitances for fire detection systems collective, AnalogPLUS, interactive, FDnet
007227	Technical manual Detector exchanger and tester FDUD292
007228	Data Sheet Test equipment and accessories FDUD291, FDUD292, FDUD293, RE6, RE7T, RE8ST, RE8STCO, RE10, FDUM291, FDUM292, FDUL221, Sinteso-Test, FDUD29x-E
008250	Technical Manual Line tester FDUL221
008331	List of compatibility (for 'Sinteso™' product line)
008726	AlgoRex CS1140 Fire detection system Commissioning hardware EP7F
008843	FS20 Fire detection system - Planning
009078	FS20 Fire detection system - Configuration
009718	Technical Manual Intelligent detector tester FDUD293
A6V10208546	Installation Detector base FDB20x/FDB201-AA, FDB22x/FDB221-AA, Base attachment FDB291, Detector designation plate FDBZ291, Dummy detector FDX291
A6V10210362	FS720 Fire detection system - Planning
A6V10210424	FS720 Fire detection system - Configuration
A6V10229261	List of compatibility (for 'Cerberus™ PRO' product line)
A6V10324618	Planning, Mounting/Installation, Commissioning, Maintenance of fire detection installations with addressed detector lines in potentially explosive atmospheres
A6V10346580	Technical Manual Automatic fire detector FDOOT241-A9-Ex
A6V10367521	Technical Manual Automatic fire detector OOH740-A9-Ex

Please also observe the documentation for your fire detection system.

1.3 Download center

You can download various types of documents, such as data sheets, installation instructions, and license texts via the following Internet address:

<http://siemens.com/bt/download>

- Enter the document ID in the 'Find by keyword' input box.



You will also find information about search variants and links to mobile applications (apps) for various systems on the home page.

1.4 History of changes

The reference document's version applies to all languages into which the reference document is translated.



The first edition of a language version or a country variant may, for example, be version 'd' instead of 'a' if the reference document is already this version.

The table below shows this document's history of changes:

Modification index	Edition date	Brief description
a	2014-09-01	First edition

The table below shows the published language versions with the corresponding modification index:

Modification index	en_--	de_--	fr_--	it_--	es_--
a	X	X	X	X	X

X = published

– = no publication with this modification index

2 Principles and conditions of modernization

2.1 Using multiple protocol detectors

Multiple protocol detectors for areas at risk of explosion can quickly and efficiently replace point detectors that are already fitted on collective Ex detector lines.

The point detectors can either be replaced individually or as a complete detector line.

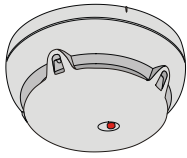
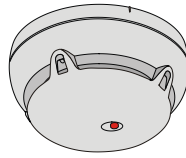
Installed point detectors can be replaced e.g. during scheduled maintenance visits by a service technician.

2.2 Characteristics of multiple protocol detectors

The multiple protocol detectors FDOOT241-A9-Ex and OOH740-A9-Ex may communicate via different detector line protocols.

These detectors automatically recognize the protocol on the detector line (e.g., FDnet-Ex/C-NET-Ex or collective Ex) and switch to this protocol.

This functionality simplifies detector line commissioning during modernization because additional measures are not normally needed on the point detector.

Neural fire detector FDOOT241-A9-Ex	Neural fire detector OOH740-A9-Ex
	
Can be used in collective Ex mode	Can be used in collective Ex mode
Can be used addressed in the FDnet-Ex	Can be used addressed in the C-NET-Ex

2.3 Step-by-step modernization

Step-by-step modernization involves firstly replacing the existing detectors with ones which support both the current detector protocol – hereinafter referred to as the alternative protocol – and the FDnet-Ex/C-NET-Ex.

The replaced detectors initially continue to be operated with the alternative protocol.

If the fire control panel is replaced at the end of the modernization project, the point detectors automatically change over to the new protocol (FDnet-Ex/C-NET-Ex). The existing cabling can usually be transferred with ease.

These measures enable out-of-date fire detection installations to be gradually replaced with modern, sensitive fire detection installations with false alarm immunity.



This document does not cover modernization via the control panel with a line card of an alternative protocol, e.g. collective.

Step 1: Replacing the existing point detectors with multiple protocol detectors

- The detectors communicate with the protocol of the installed system (collective Ex).
- No changes are required on the fire control panel.

Step 2: Replacing the existing fire control panel with a control panel Sinteso FC20xx or Cerberus PRO FC72x

- At the same time, all peripheral devices that have not been modernized, such as manual call points and input/output modules, must be replaced with devices which can be used on the FDnet-Ex/C-NET-Ex.
- As an alternative to replacing the control panel, the existing line card in the fire control panel can be replaced with a line card (FDnet/C-NET).

2.4 General limitations on modernization

When planning a modernization, the following limitations must be taken into account:

- The following devices can generally not be replaced with a multiple protocol device:
 - All flame detectors
 - All manual call points
- Note the information provided in document 001508 relating to installation (calculation of the capacity layer). See chapter 'Applicable documents'.
- All detectors that have not been replaced must be replaced with detectors from the 'Sinteso' or 'Cerberus PRO' product lines when changing over to FDnet-Ex/C-NET-Ex.
- Limitations exist when connecting external alarm indicators. You will find more information in chapter 'Limitations on detector families'.
- Only the 'stub' topology is permitted in areas at risk of explosion. The following are not admissible:
 - 'Loop'
 - 'Sub-stub on loop'
 - 'Sub-stub on sub-stub'
 - 'Sub-stub on stub'
 - Several stub branches from one location.



You will find information about detector compatibility in documents 008331 (Sinteso) and A6V10229261 (Cerberus PRO).

You will find information about the FDnet/C-NET detector line topology in documents 008843 (Sinteso) and A6V10210362 (Cerberus PRO).

You will find information about the FDnet-Ex/C-NET-Ex detector line topology in document A6V10324618.

See chapter 'Applicable documents [[→ 8](#)]'.

2.5 Limitations on the collective Ex detector family

	 WARNING
	<p>Replacing an intrinsically safe point detector in an area at risk of explosion</p> <p>Risk of explosion</p> <ul style="list-style-type: none"> ● Before replacing the point detector, carry out all necessary safety calculations and safety assessments. ● Document evidence of explosion protection. ● Please take the information in document 001204 and in the technical manual for the point detector, as well as national and internal regulations and standards, into account.

When using a point detector FDOOT241-A9-Ex or OOH740-A9-Ex on a collective Ex detector line, you must observe the following points:

- Only a stub topology is permitted for intrinsically safe collective Ex detector lines and FDnet-Ex/C-NET-Ex detector lines. You will find more information in documents 001204 and A6V10324618.
- When using an AlgoRex point detector via an FDOOT241-A9-Ex or OOH740-A9-Ex, the detector base must be replaced. Replace the AlgoRex detector base with a detector base FDB20x.
- Only one external alarm indicator can be connected to an individual point detector. Only use alarm indicators FDAI9x-Ex. These external alarm indicators are permitted for use in areas at risk of explosion.

3 Point detectors and base adapters

The table below shows which point detectors can be replaced with multiple protocol detectors:

Detector family	Point detectors which can be replaced	Replaced with	
		Multiple protocol detectors	Base adapter
Collective Ex: <ul style="list-style-type: none"> Siemens/Cerberus 	<ul style="list-style-type: none"> DO1101A-Ex DT1101A-Ex DT1102A-Ex 	FDOOT241-A9-Ex	---
		OOH740-A9-Ex	---




The point detectors FDOOT241-A9-Ex and OOH740-A9-Ex may not be installed using base adapters.

4 Undertaking modernization

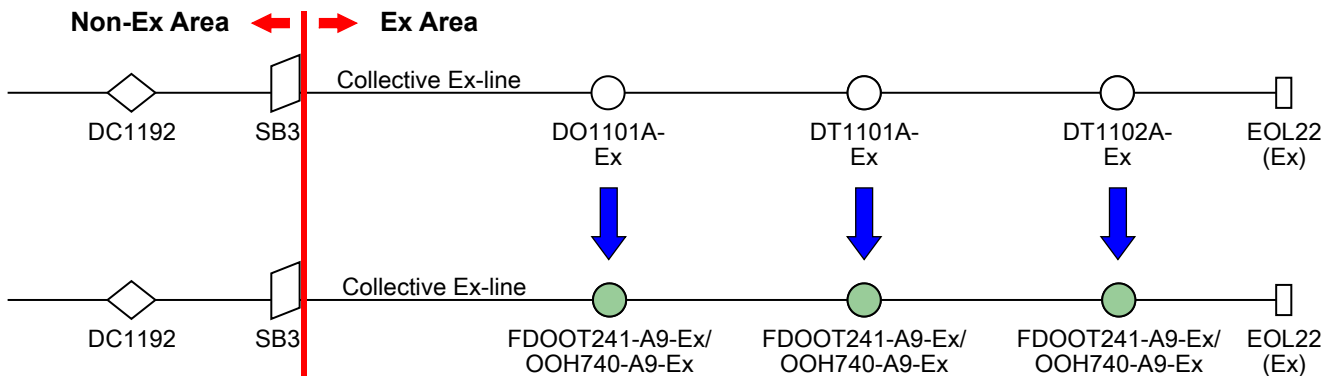
4.1 Step 1: Detector modernization

The following steps must be taken during each modernization:

1. For information about installing new detector bases FDB20x or FDB22x, see chapter 'Base replacement [→ 16]'
2. For information about configuring the detectors, see chapter 'Configuration of detector type [→ 17]'
3. For information about carrying out function tests for detectors, see chapter 'Test the detectors [→ 18]'

	⚠ WARNING
	<p>Work carried out by personnel who are not sufficiently qualified</p> <p>Risk of explosion</p> <ul style="list-style-type: none"> • Work in potentially explosive areas may only be carried out by qualified specialists or by specially instructed persons, in accordance with the national and international directives and regulations.

Point detectors that can only be operated in collective mode are replaced with multiple protocol detectors. The detector lines are still operated in collective mode.




4.1.1 Base replacement

On collective Ex detector lines, when replacing the point detector with a multiple protocol detector, the switch can be made to a Sinteso detector base.

Use the following detector bases:

- FDB201
- FDB202
- FDB221
- FDB222

	<p>⚠ WARNING</p>
	<p>Using incorrect detector bases in the area at risk of explosion</p> <p>Risk of explosion</p> <ul style="list-style-type: none"> ● When modernizing the collective Ex detector line, point detectors FDOOT241-A9-Ex and OOH740-A9-Ex may only be used with detector bases FDB20x or FDB22x. Do not use detector bases from the AlgoRex product range or base adapters.

You will find information about installing the detector bases FDB20x and FDB22x in document A6V10208546. See chapter 'Applicable documents [→ 8]'.

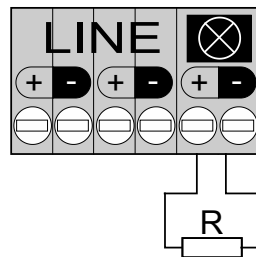
4.1.2 Configuration of detector type

The point detectors FDOOT241-A9-Ex and OOH740-A9-Ex can be set to the existing detector type using parameter set resistors.

Procedure:

- ▷ Detector bases FDB20x or FDB22x are installed.
 - 1. Install a point detector FDOOT241-A9-Ex or OOH740-A9-Ex directly in the new detector base as a replacement for a point detector DO1101A-Ex.
 - 2. If the point detector FDOOT241-A9-Ex or OOH740-A9-Ex is intended to replace a heat detector: Also install a standard resistor to set another parameter set.
 - Determine the resistance required using the table below.
 - Install the resistor as shown in the diagram.
- ⇒ The point detector FDOOT241-A9-Ex or OOH740-A9-Ex is installed and configured.

Installing the parameter set resistor R in the detector base



Values for the parameter set resistor R (≥ 200 mW)

R	Parameter set
∞	Sensitive (when replacing a point detector DO1101A-Ex)
18 k Ω	A1R (when replacing a point detector DT1101A-Ex)
10 k Ω	BR (when replacing a point detector DT1102A-Ex)


4.1.3 Test the detectors


4.1.3.1 Test methods

The various detector types can be tested with the following tools:

Detector type	Test method	Tool
DT (thermal)	● Hot air	● RE7T
	● Detector exchanger and tester or intelligent detector tester	● FDUD292, FDUD293
DO (optical)	● Test gas	● RE6 with REF8/8S
	● Detector exchanger and tester or intelligent detector tester	● FDUD292, FDUD293
DOOT (optical, thermal)	● Test gas	● RE6 with REF8/8S
	● Hot air	● RE7T
	● Detector exchanger and tester or intelligent detector tester	● FDUD292, FDUD293

You will find more information about the testers in document 007228. See chapter 'Applicable documents'.

	⚠ WARNING
	Using non-intrinsically safe devices in areas at risk of explosion Risk of explosion <ul style="list-style-type: none"> ● Do not use the detector exchanger and tester FDUD292 or the intelligent detector tester FDUD293 in areas at risk of explosion.

	⚠ WARNING
	Using the detector testers RE6 and RE7T in areas at risk of explosion Risk of explosion <ul style="list-style-type: none"> ● Detector testers RE6 and RE7T must only be operated in areas that are not at risk.

4.1.3.2 Testing detectors without detector exchanger and tester/detector tester

The point detectors are highly resistant to deceptive phenomena. This means that optical fire detectors, for example, will recognize the immediate occurrence of smoke (such as that which occurs during testing with test gas) as a deceptive phenomenon and will not trigger an alarm. This is desirable in normal operation; however, it does make testing with test gas problematical.

To enable detector testing with test gas or hot air, the detector must be switched to test mode. Testing with test gas or hot air is performed differently on addressed detector lines and collective detector lines.

Collective Ex detector lines

On a collective Ex detector line, the detector is not set to test mode if the detector group is switched to 'Test' on the control panel.

Detectors on a collective Ex detector line are switched to test mode for 3 minutes in the following cases:

- Starting up and resetting the detector line
- Inserting the detector
- Removing the detector from the detector line and re-inserting it



To trigger a detector using test gas, normally 2...4 gas discharges at intervals of approx. 2 seconds are required. When the detector is in test mode, activation takes place after approximately 10 seconds.

4.1.3.3 Setting the detector zones to 'Test'

Collective Ex detector lines

Setting the respective detector zones to 'Test' on the control panel does not result in a situation where the detectors can be activated at speed.

4.1.4 Starting up from collective mode

When starting up for the first time, you must perform the following:

1. Switch the detector line on.
2. Wait at least 30 s.
3. Read in the detector line until all the detectors installed have been recognized.

4.2 Step 2: Replacing the control panel and changing over to FDnet-Ex/C-NET-Ex protocol

4.2.1 Replacing the control panel or installing a line card

During modernization, we would recommend replacing the existing fire control panel with a control panel Sinteso FC20xx or Cerberus PRO FC72x.

In the case of the 'AlgoRex' and 'SIGMASYS' product lines, a line card (FDnet/C-NET) can be fitted in the existing fire control panel (E3M141, FDC).

Control panel	Line card	Order number
AlgoRex	E3M141	S54405-A9-A1
SIGMASYS	FDC	S54230-B150-A2

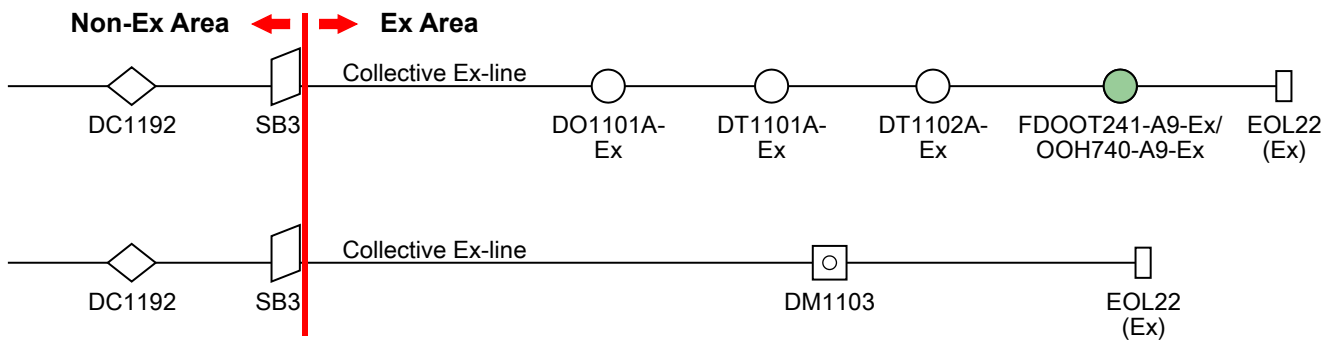
4.2.2 Replacing the remaining peripheral devices

When changing over to the FDnet-Ex/C-NET-Ex, all peripheral devices on a detector line which have not been modernized must be replaced. This applies to the following device groups in particular:

- All manual call points
 - Replace the manual call points with manual call points FDM233-Ex
- The alarm indicators must be replaced with alarm indicators FDAI9x-Ex.

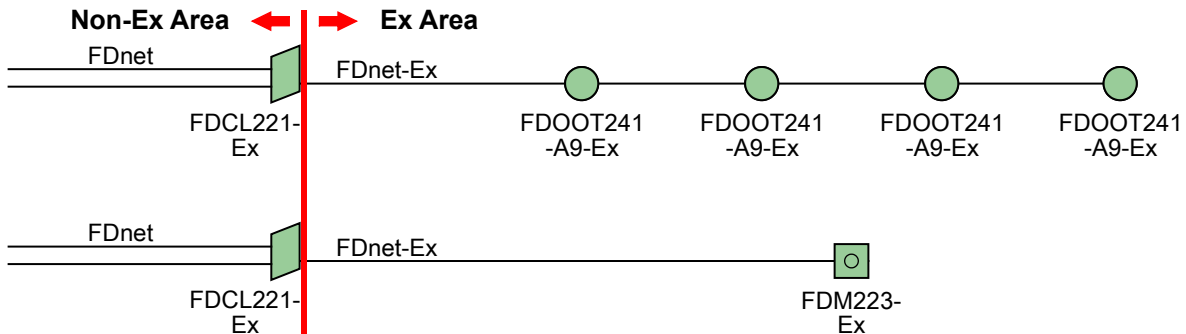
Migrating the detector line from 'Collective' to 'Addressed'

The starting point is a collective detector line in which no multiple protocol detectors are installed yet (bottom detector line in the diagram) or a detector line which already has all of or some of the multiple protocol detectors installed (top detector line in the diagram).

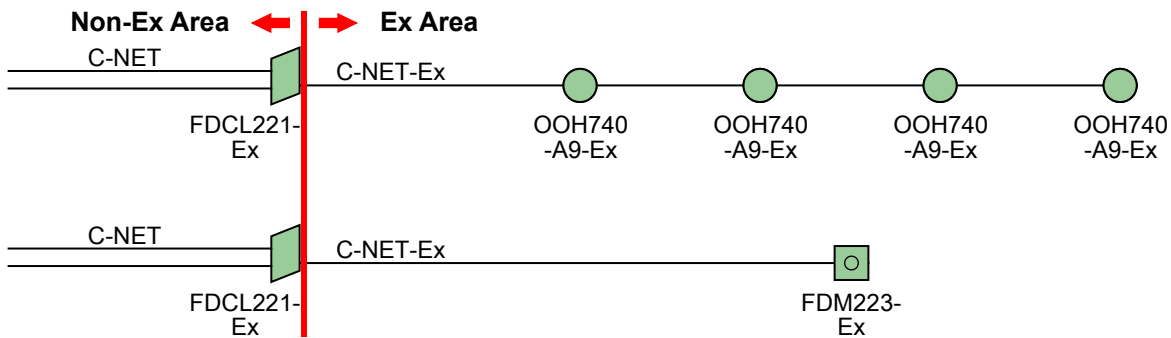


Migration to the following protocols can take place, depending on the control panel being used:

FDnet-Ex: Use the multiple protocol detector FDOOT241-A9-Ex



C-NET-Ex: Use the multiple protocol detector OOH740-A9-Ex



If the national and regional regulations in your country permit automatic fire detectors and manual call points to be operated on a single stub, all detector types can be operated on a joint stub.

4.2.3 Converting collective Ex detector lines

When switching a collective Ex detector line with point detectors FDOOT241-A9-Ex or OOH740-A9-Ex, the following points must be observed in particular:

- Remove the EOL resistors on the collective Ex detector lines.
- The safety barriers SB2 or SB3 and DC1192 must be removed and a line adapter (Ex) FDCL221-Ex must be installed instead. The line adapter (Ex) FDCL221-Ex provides safe isolation between the non-intrinsically safe and the intrinsically safe circuit.
- There is no need to replace the detector base FDB20x with a detector base FDB22x.
- There is no need to remove parameter set resistors on the terminals for the external alarm indicator. This does not restrict the function of the detectors on the FDnet-Ex/C-NET-Ex.
- If, on an FDnet-Ex/C-NET-Ex detector line, a point detector is removed from a collective detector base (such as a detector base FDB201), communication between the control panel and all subsequent detectors is interrupted. A fault is indicated on the control panel.
- Remove the diodes in the detector bases in the case of mixed collective Ex detector lines to which manual call points and point detectors are connected.
- Check whether only permitted topologies are being used. Only the 'stub' topology is permitted.
- The maximum possible number of peripheral devices per stub must be checked.
- Check whether the max. lengths of line and capacities are within the permissible data.



You will find more information on safely installing an FDnet-Ex/C-NET-Ex detector line in document A6V10324618.

4.2.4 Starting up for the first time under FDnet-Ex/C-NET-Ex

When starting up for the first time, you must perform the following:

1. Switch the detector line on.
2. Wait at least 30 s.
3. Read in the detector line until all the detectors installed have been recognized.

The peripheral devices must change to FDnet-Ex/C-NET-Ex mode. We would recommend using the FDUL221 line tester for the changeover.

You will find more information on the line tester FDUL221 in document 008250. See chapter 'Applicable documents [→ 8]'.

4.2.5 Configuration

The multiple protocol detectors are configured directly on the control panel or using the relevant configuration software for the fire control panel.

You will find information about configuration with the software for the respective fire detection system in the following documents:

Fire detection system	Software	Document ID
FS20	SintesoWorks	009078
FS720	Cerberus Engineering Tool	A6V10210424

See chapter 'Applicable documents [→ 8]'.

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