

Technical Description

MEW01323

Revision 5

IS units for Hazardous (Ex) areas 2840, 2841 & 2842

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Table of contents

1	Introduction	3
2	Definitions / Explanations	4
3	General description	5
3.1	Intrinsically Safe barrier unit 2842	5
3.2	Intrinsically Safe analog detectors	5
4	IS barrier unit 2842 - working principle	7
5	Intrinsically Safe (IS) units	8
5.1	Intrinsically Safe (IS) analog photoelectric smoke detector 2840	8
5.2	Intrinsically Safe (IS) analog heat detector 2841	9
5.3	Intrinsically Safe (IS) barrier unit 2842	10
6	Connections	11
6.1	IS barrier unit 2842	11
6.2	IS analog photoelectric smoke detector 2840	12
6.3	IS analog heat detector 2841	12
7	Mounting information	13
7.1	IS barrier unit 2842	13
7.2	IS analog photoelectric smoke detector 2840	13
7.3	IS analog heat detector 2841	13
7.4	IS back-box 2843	14
8	Technical data	15
9	Revision history	16

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1 Introduction

This document¹ describes the Intrinsically Safe (IS) units for Hazardous (Ex) areas:

Intrinsically Safe analog photoelectric smoke detector **2840**

Intrinsically Safe analog heat detector **2841**

Intrinsically Safe barrier unit **2842**

Intrinsically Safe back-box **2843**

Intrinsically Safe is normally shortened to **IS**.

For more information see chapter "General description", page 5.

¹ Original file name: L:\User documents\IS units\MEW01323 (Rev 5).doc

2 Definitions / Explanations

Definitions / explanations / abbreviations / etc. frequently used or not explained elsewhere in the document.

C.i.e. Control and indicating equipment (=control unit)

C.U. Control unit (=Control and indicating equipment)

S/W Software

H/W Hardware

IS Intrinsically Safe.

IS equipment is defined as "equipment and wiring which is incapable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture in its most easily ignited concentration." (ANSI/ISA-RP12.6²) This is achieved by **limiting the amount of power** available to the electrical equipment in the hazardous area to a level below that which will ignite the gases.

² Wiring practices for hazardous (classified) locations instrumentation—Part I: Intrinsic safety.

3 General description

The Intrinsically Safe (IS) units shall be used for Hazardous (Ex) areas, which according to regulations require IS equipment.

The following approved Panasonic IS units, in compliance with the ATEX directive 94/9/EC, are available:

Intrinsically Safe analog photoelectric smoke detector **2840**

Intrinsically Safe analog heat detector **2841**

Intrinsically Safe barrier unit **2842**

Intrinsically Safe back-box **2843**

3.1 Intrinsically Safe barrier unit 2842

The IS barrier unit **2842** has to be mounted outside the Hazardous (Ex) area and is connected to a c.i.e. via a COM loop.³ On the COM loop can also be connected any type of COM loop units for the EBL system respectively. The IS barrier unit takes no COM loop address (i.e. no programming via Win128 / 512 / G3) but 24 V DC (50 mA) power supply is required.

The IS barrier unit has one **IS COM line** input for the **Intrinsically Safe analog detectors** only.

3.2 Intrinsically Safe analog detectors

The **IS analog photoelectric smoke detector 2840** and the **IS analog heat detector 2841**, with or without the **IS back-box 2843**, are mounted inside the Hazardous (Ex) area and they are connected to the IS barrier unit 2842 via the **IS COM line**. Up to 20 IS detectors and only IS detectors 2840 and 2841 can be connected on the IS COM line, which has no return cable to the IS barrier unit (i.e. it's not a loop), no end-of-line device and can be max. 500 m.

The IS COM line cable shall, according to DIN VDE 0165, have blue outer jacket (e.g. FKAR-PG 2 x 0.5 mm², blue).

The IS analog photoelectric smoke detector **2840** is via Win128 / 512 / G3 programmed like an Analog photoelectric smoke detector **4301**, i.e. it takes one COM loop address.

The IS analog heat detector **2841** is via Win128 / 512 / G3 programmed like an Analog heat detector **3308**, i.e. it takes one COM loop address.

³ Valid for the systems EBL128, EBL512 and EBL512 G3.

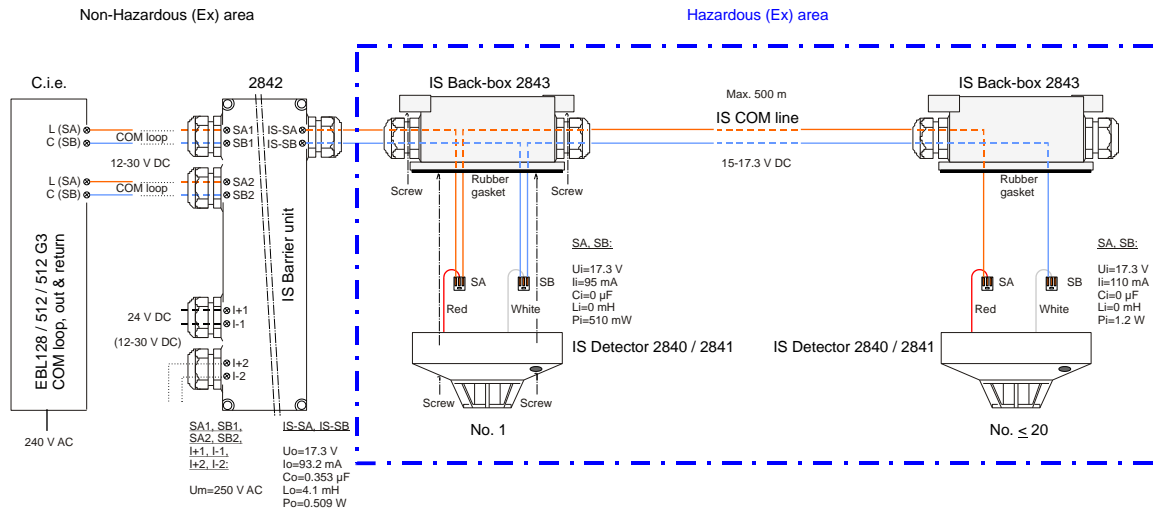


Figure 1. Intrinsically safe (IS) detectors 2840 / 2841, with or without the IS back-box 2843, connected to an IS barrier unit 2842, which is connected to the c.i.e. via a COM loop. On the COM loop can be connected one or more IS barrier units and any type of COM loop units for the system respectively. On the IS COM line can only the IS detectors 2840 and 2841 be connected. 24 V DC (50 mA) power supply can be via the c.i.e. or any external power supply unit.

4 IS barrier unit 2842 - working principle

Communication

The COM loop is separated from the IS COM line via an optocoupler.

The COM loop communication signals are transmitted to the IS COM line, via the IS barrier unit. The amount of power is limited, see chapter "Definitions / Explanations", page 4.

The IS COM line communication signals are put back to normal levels, via the IS barrier unit, and then transmitted to the c.i.e. via the COM loop.

Power supply

The IS barrier unit's 24 V DC power supply is separated from the IS COM line with a transformer (DC / DC converter). The amount of power is limited, see chapter "Definitions / Explanations", page 4.

Normal IS COM line voltage is 16 V DC (15 – 17.3 V).

Normal COM loop voltage is 24 V DC (12 – 30 V).

5 Intrinsically Safe (IS) units

5.1 Intrinsically Safe (IS) analog photoelectric smoke detector 2840



The IS analog photoelectric smoke detector **2840** shall be connected to a c.i.e. via an IS barrier unit 2842 (IS COM line) and programmed via Win128 / 512 / G3 like an Analog photoelectric smoke detector **4301**⁴, i.e. it takes one COM loop address. The COM loop address and NORMAL mode are set in the detector with the address setting tool 3314. The sensitivity, alarm level, etc. are depending on the selected alarm algorithm, i.e. the same algorithms as for the 4301 detector.⁵ The detector has one built-in LED to indicate that the detector has generated a fire alarm.

The detector can be mounted with or without the water-proof IS back-box 2843, which have two cable glands (PF½").

ATEX class:	⚠ II 1 G Ex ia IIC T5 Ga
Zone classification:	Zone 0 / 1 / 2
Ingress Protection ratings:	IP 20 (detector 2840) IP 44 (detector 2840 and IS back-box 2843)
<small>NOTE! These IP ratings are outside of the scope of the LPCB certification. Verified in Panasonic test laboratory only.</small>	
IS COM line operating voltage:	16 V DC (15 – 17.3 V).
IS COM line current consumption:	Max. 0.3 / 1.5 mA (quiescent / alarm cond.).
Ambient operating temperature:	-10 to +55°C
Ambient storing temperature:	-25 to +70°C
Ambient humidity:	Max. 95 % RH, non cond.
Weight (approx.):	300 g (detector 2840) 560 g (detector 2840 and IS back-box 2843)
Size (excl. cable glands):	Ø = 102 mm (detector 2840) Ø = 110 mm (IS back-box 2843) h = 62 mm (detector 2840) h = 58 mm (IS back-box 2843)
Construction:	PC & ABS
Colour:	Gray (N8, Munsell colour code)
CE 10 EC Certificate no. 0832-CPD-1526; EN54-7.	

⁴ In principle, the 2840 detector is a 4301 detector but with a different housing, IP rating etc.

⁵ Algorithms, function, etc. for an analog photoelectric smoke detector are described in the Planning Instructions for the EBL system respectively.

5.2 Intrinsically Safe (IS) analog heat detector 2841



The IS analog heat detector **2841** shall be connected to a c.i.e. via an IS barrier unit 2842 (IS COM line) and programmed via Win128 / 512 / G3 like an Analog heat detector **3308**⁶, i.e. it takes one COM loop address. The COM loop address and NORMAL mode are set in the detector with the address setting tool 3314. The alarm temperature, etc. are depending on the selected alarm algorithm, i.e. the same algorithms as for the 3308 detector.⁷

The detector has one built-in LED to indicate that the detector has generated a fire alarm.

The detector can be mounted with or without the water-proof IS back-box 2843, which have two cable glands (PF½").

ATEX class: **Ex II 1 G Ex ia IIC T5 Ga**

Zone classification: **Zone 0 / 1 / 2**

Ingress Protection ratings: **IP 20 (detector 2841)**

NOTE! These IP ratings are outside of the scope of the LPCB certification. Verified in Panasonic test laboratory only. **IP 66/67 (detector 2841 and IS back-box 2843)**

IS COM line operating voltage: **16 V DC (15 – 17.3 V).**

IS COM line current consumption: **Max. 0.3 / 1.5 mA (quiescent / alarm cond.).**

Ambient operating temperature (is depending on the heat detector class, i.e. it is depending on the selected alarm algorithm:

Min. / Typical / Max. **Class A1: -10 / +25 / +50°C**
Class A2 S: -10 / +25 / +50°C
Class B S: -10 / +40 / +55°C

Ambient storing temperature: **-25 to +70°C**

Ambient humidity: **Max. 95 % RH, non cond.**

Weight (approx.): **325 g (detector 2841)**
585 g (detector 2841 and IS back-box 2843)

Size (excl. cable glands): **Ø = 102 mm (detector 2841)**
Ø = 110 mm (IS back-box 2843)
h = 65 mm (detector 2841)
h = 58 mm (IS back-box 2843)

Construction: **PC & ABS**

Colour: **Gray (N8, Munsell colour code)**

CE 10 EC Certificate no. 0832-CPD-1527; EN54-5.

⁶ In principle, the 2841 detector is a 3308 detector but with a different housing, IP rating etc.

⁷ Algorithms, function, etc. for an analog heat detector are described in the Planning Instructions for the EBL system respectively.

5.3 Intrinsically Safe (IS) barrier unit 2842

The barrier p.c.b. is mounted in a water-proof gray ABS box supplied with five cable glands.



The IS barrier unit **2842** has to be mounted outside the Hazardous (Ex) area and shall be connected to a c.i.e. via a COM loop. The IS barrier unit takes no COM loop address (i.e. no programming via Win128 / 512 / G3) but 24 V DC (50 mA) power supply is required.⁸

The IS detectors 2840 and 2841 have to be connected to the c.i.e. via the IS barrier unit's IS COM line for Intrinsically Safe analog detectors only. The IS barrier unit has two cable glands for the COM loop (in & out), two cable glands for the 24 V DC power supply (in & out) and one cable gland for the IS COM line. All cable glands are M16 x 1.5.

ATEX class: **⚠ II (1) G [Ex ia Ga] IIC**
Zone classification: n/a
Ingress Protection rating: **IP 66 / 67**

NOTE! These IP ratings are outside of the scope of the LPCB certification. Verified in Panasonic test laboratory only.

COM loop operating voltage: 24 V DC (12 – 30 V).
COM loop current consumption: Max. 10 mA
IS COM line operating voltage: 16 V DC (15 – 17.3 V).
External power supply voltage: 24 V DC (12 – 30 V DC).
External power supply current consumption: Max. 50 mA.
Ambient operating temperature: -10 to +55°C
Ambient storing temperature: -25 to +70°C
Ambient humidity: Max. 95 % RH, non cond.
Weight (approx.): 3100 g
Size (excl. cable glands): 280 x 280 mm
h = 133 mm
Construction: ABS
Colour: Gray (N8, Munsell colour code)
CE 10 EC Certificate no. 0832-CPD-1528; EN54-18: 2005.

⁸ From the c.i.e. or an external power supply unit.

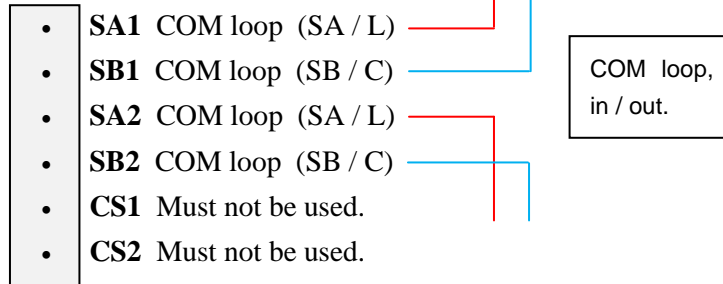
6 Connections

6.1 IS barrier unit 2842

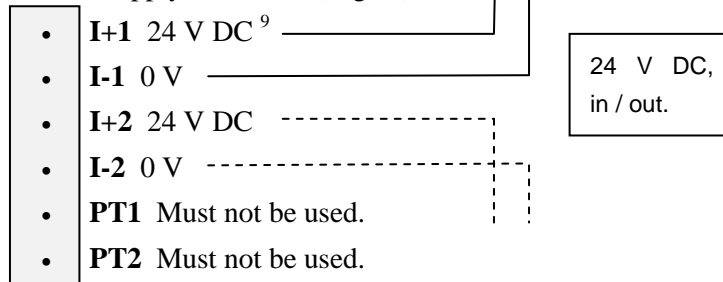
The IS barrier unit has three screw terminal connectors.

Connector wire approx. 0.08 – 2.5 mm² (AWG 28 – 12).

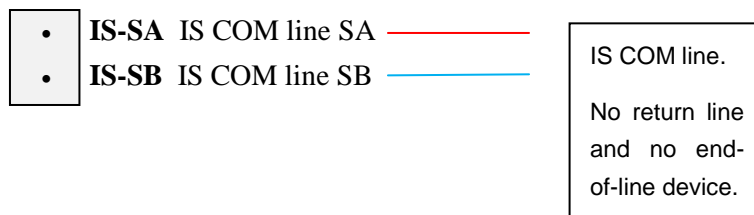
COM loop connector ("left"):



Power supply connector ("right"):



IS connector:



NOTE!

The cable gland close to the IS connector has to be used for the (blue) IS COM line cable.

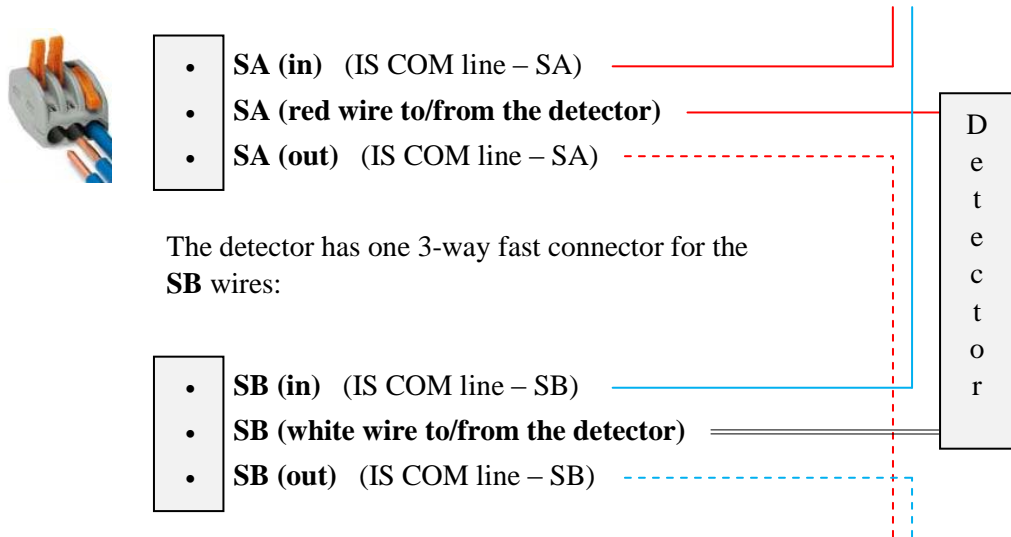
The cable screen is not used.

⁹ From the c.i.e. or external power supply unit.

6.2 IS analog photoelectric smoke detector 2840

Fast connectors for 0.08 to 2.5 mm² wires (AWG 28-12).

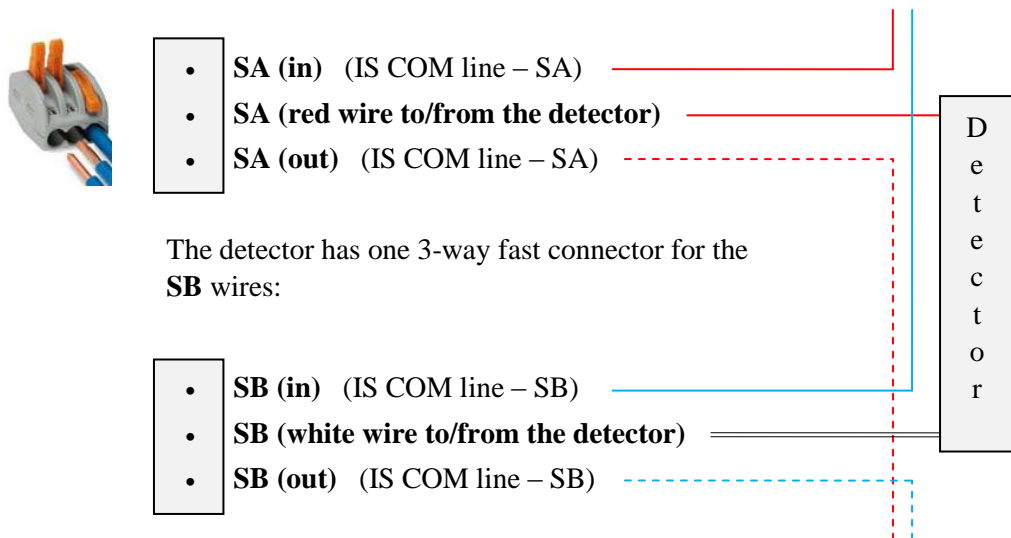
The detector has one 3-way fast connector for the **SA** wires:



NOTE! The cable screen is not used.

6.3 IS analog heat detector 2841

The detector has one 3-way fast connector for the SA wires:



NOTE! The cable screen is not used.

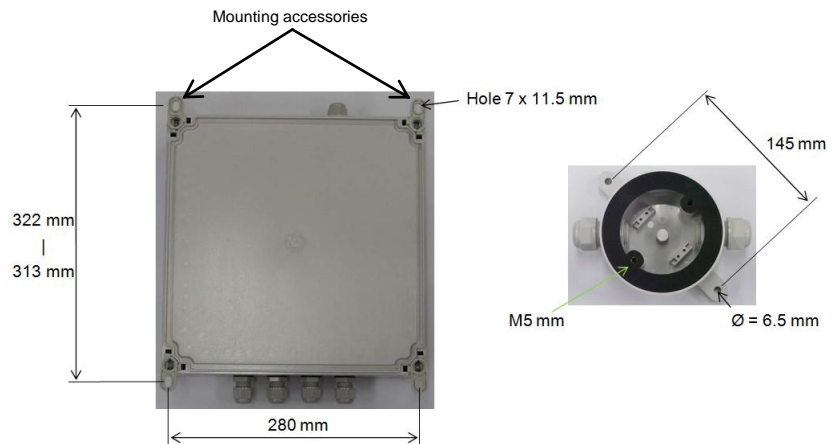
7 Mounting information

7.1 IS barrier unit 2842

The IS barrier unit **2842** has to be mounted outside the Hazardous (Ex) area.

The IS barrier unit is delivered with four mounting accessories that should be plugged in each corner of the box, see below.

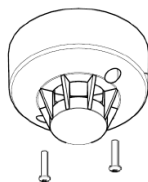
Type and length of mounting screws to be used is depending on the type of wall, etc.



7.2 IS analog photoelectric smoke detector 2840

The IS analog photoelectric smoke detector **2840** shall be mounted inside the Hazardous (Ex) area.

The detector can be mounted with or without the water-proof IS back-box 2843. The IP rating will be different depending on if the IP back-box 2843 is used or not. See chapter 5.1 Intrinsically Safe (IS) analog photoelectric smoke detector 2840.



When the detector is mounted without the IS back-box 2843, i.e. with another back-box or directly in the ceiling, it has two mounting holes, c/c 70 mm, $\text{Ø}=6$ mm. Type of screws is depending on the type of ceiling or the back-box that is used.

When the detector is mounted with the IS back-box 2843, the two supplied 25 mm M5 screws shall be used and the black rubber gasket has to be in correct position.

7.3 IS analog heat detector 2841

The IS analog heat detector **2841** shall be mounted inside the Hazardous (Ex) area.

The detector can be mounted with or without the water-proof IS back-box 2843. The IP rating will be different depending on if the IP back-box 2843 is used or not. See chapter 5.2 Intrinsically Safe (IS) analog heat detector 2841.



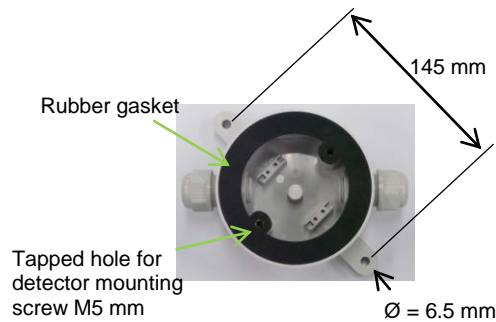
When the detector is mounted without the IS back-box 2843, i.e. with another back-box or directly in the ceiling, it has two mounting holes, c/c 70 mm, $\text{Ø}=6$ mm. Type of screws is depending on the type of ceiling or the back-box that is used.

When the detector is mounted with the IS back-box 2843, the two supplied 25 mm M5 screws shall be used and the black rubber gasket has to be in correct position.

7.4

IS back-box 2843

The water-proof IS back-box 2843 has two mounting holes, c/c 145 mm, h=14 mm and $\text{Ø}=6.5$ mm. Type of screws is depending on the type of ceiling. The black rubber gasket has to be in correct position before the detector is mounted on the back-box.



8 Technical data

See chapter "Intrinsically Safe (IS) units", page 8.

9 Revision history

The changes in conjunction with the latest revision are, when possible, **marked red** in the document.

Revision 1

The following text is added in the following chapters:

NOTE! These IP ratings are outside of the scope of the LPCB certification.

Verified in Panasonic test laboratory only.

5.1, 5.2 & 5.3

Revision 2

Text about different zone classification deleted in the following chapters:

5.1, 5.2, 7.2 and 7.3

Revision 3

3.1 Info. revised.
3.2 Info. added. Info. in Figure 1 revised.
4 Info. revised.
5.1 Info. revised.
5.2 Info. revised.
5.3 Info. revised.
6.1 Info. revised.
7.1 Info. revised.

Revision 4

6 Info. added.
Company name etc. on the last page.

Revision 5

5.2 IP rating revised

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