



CERTYFIKAT

- [1] **CERTIFICATE OF THE WE TYPE EXAMINATION**
- [2] Devices, protection systems, components and subassemblies designed for hazardous areas.
Directive 94/9/WE
(Regulation of the Minister of Economics, Labour and Social Policy (MGPiPS) from 28.07.2003.
Official Journal (Dz.U.) No.43, Item 3).
- [3] Certificate of the WE type examination
- KDB 04ATEX120**
- [4] Device:
S2Ex type Transducer
- [5] Manufacturer:
Labor-Aster
- [6] Address:
19 Czechowicka ST., 04-218 Warsaw, Poland
- [7] Objective device or protection system together with its approved variants is described in the annex to this certificate and in the documentation listed thereby.
- [8] Central Mining Institute, entity no. 1453 notified in accordance with paragraph 9th of 94/9/WE Directive from March 23, 1994, confirms that the device or protection system under consideration meets the essential safety and health protection requirements in the issue of designing and construction of devices and protection systems for use in hazardous areas specified in the annex 2 to 94/9/WE Directive (Chapter 2 of the MGPiPS Regulation on 28.07.2003, Official Journal (Dz.U.) No.143, Item. 1393).
The results of the assessment and examinations are specified in the KDB report no. 04.246
- [9] The essential safety and health protection requirements are realized by fulfilling the norms:
PN-EN 50014:2002 (U) , PN-EN 50020:2003 (U) ,
PN-EN 50284:2002 (U) , PN-EN 50303:2002 (U)
- [10] „X“ sign placed behind the certificate number denotes special conditions of use in hazardous areas, specified in the annex to his certificate.
- [11] Present certificate of the WE type examination applies to the construction, assessment and examination of the objective device or protection system in accordance with 94/9/WE Directive. The certificate doesn't apply to other requirements of the Directive related to the production and marketing of the device or protection system.
- [12] The device or protection system should be marked:



I (M1) [EExia]I
II (1) GD [EExia]IIC

Date of issue: 22.07.2004

Page1 of 6

KDB ATEX

Główny Instytut Górnictwa
Jednostka Certyfikująca
Zespół Certyfikacji Wyróbów
KD „Barbara”
ul. Podleska 72
43-190 Mikołów,
tel. (+48) 32 3246550
fax. (+48) 32 3224931
www.gig.katowice.pl

Niniejszy certyfikat może być
powielany jedynie w całości
wraz z załącznikami



[13]

Annex

[14]

The Certificate of the WE KDB 04ATEX120 type examination

[15] **Description:**

S2Ex- type Transducer is an electronic device to be located outside the hazardous area and designed for:

- conversion of the intrinsically safe input signal deriving from devices located in safe area into galvanically separated, standardized voltage or current signal (realization –SA, -U, -R, -F).
- conversion of the non intrinsically safe input signal into galvanically separated, standardized voltage or current signal operating the devices located in the hazardous area (realization -SB),
- providing supply for devices in hazardous zone (realisation –Z and -Supply).

Photo couplers and transformers provide the galvanic separation.

The transmitter consists of two printed circuits placed in a plastic housing providing IP20 protection level.

Technical parameters:

| | |
|--------------------------|-------------|
| Working temperature | -20 ÷ +60°C |
| Supply | 20 ÷ 28VDC |
| Housing protection level | IP20 |

Safety description

1. Separator type S2Ex–SA:

Converts the current or voltage signal from hazardous area into any current or voltage signal.

a) The intrinsically safe input circuits (**terminals 1-2**) :

$U_o= 7,5V$, $I_o= 5mA$, $P_o= 40mW$, $L_i \sim 0$, $C_i= 2nF$, values L_o i C_o should be adopted according to the table shown below:

| Group of hazardous | L_o [mH] | C_o [μF] |
|--------------------|------------|------------|
| IIA | 100 | 1,82 |
| IIB | 100 | 0,56 |
| IIC | 100 | 0,066 |

b) The intrinsically safe input parameters - terminals 1-2.

$U_i=30V$, $I_i=any$, $P_i=any$.

c) Parameters of non-intrinsically safe circuits.

„output” - terminals 5-6 and „supply” - terminals 7-8: $U_m=250V$.



[13]

Annex

[14]

The Certificate of the WE KDB 04ATEX120 type examination

[15] Description: continued

2. Transducer type S2Ex-U:

Converts the signal from the thermocouple or other sensor installed in the hazardous area into any current or voltage signal.

- a) The intrinsically safe input circuits (**terminals 1, 2, 3, 4**)

$U_o = 30V$, $I_o = 15mA$, $P_o = 110mW$, $L_i \sim 0$, $C_{i1-2} = 1nF$, $C_{i3-4} = 1nF$
values L_o i C_o should be adopted according to the table shown below:

| Group of hazardous | Lo[mH] | Co [μF] |
|--------------------|--------|---------|
| IIA | 30 | 1,8 |
| IIB | 30 | 0,56 |
| IIC | 30 | 0,066 |

- b) The intrinsically safe input parameters - terminals **1-2**:

$U_i = 30V$, $I_i = any$, $P_i = any$.

- c) Parameters of non-intrinsically safe circuits.

„output” - terminals 5-6 and „supply” - terminals 7-8: $U_m = 250V$.

3. Transducer type S2Ex-R:

Converts the signal from the thermo resistance sensor, potentiometer or other sensor installed in a hazardous area into any current or voltage signal.

- a) The intrinsically safe input circuits (**terminals 1, 2, 3, 4**) – 2- or 3- or 4 –wire measurement of resistance :

$U_o = 30V$, $I_o = 15mA$, $P_o = 100mW$, $L_i \sim 0$, $C_{i1-4} = 1nF$, $C_{i2-4} = 1nF$, $C_{i3-4} = 1nF$
values L_o i C_o should be adopted according to the table shown below:

| Group of hazardous | Lo[mH] | Co [μF] |
|--------------------|--------|---------|
| IIA | 30 | 1,8 |
| IIB | 30 | 0,56 |
| IIC | 30 | 0,066 |

- b) Parameters of non-intrinsically safe circuits.

„output” - terminals 5-6 and „supply” - terminals 7-8: $U_m = 250V$.

4. Separator type S2Ex-SB:

Converts the current or voltage signal to any current or voltage signal transmitted to the hazardous area.

- a) The intrinsically safe input circuits (**terminals 1-2**) : $C_i = 2nF$, $L_i \sim 0$
values L_o i C_o should be adopted according to the table shown below:

[13]

Annex

[14]

The Certificate of the WE KDB 04ATEX120 type examination

[15] Description: continued

| Option | Po[W] | Uo[V] | Io[mA] | Lo[mH] | | | Co[μF] | | |
|--------|-------|-------|--------|--------|-----|-----|--------|------|-------|
| | | | | IIA | IIB | IIC | IIA | IIB | IIC |
| 12V | 0,75 | 12,6 | 92 | 20 | 11 | 2,8 | 27 | 7,4 | 1,15 |
| 14V | | 14,7 | | | | | 14,9 | 3,86 | 0,62 |
| 16V | | 16,8 | | | | | 9,3 | 2,29 | 0,39 |
| 20V | | 21,0 | | | | | 4,78 | 1,27 | 0,188 |
| 24V | | 25,2 | | | | | 2,90 | 0,82 | 0,107 |
| 24V/2W | 2 | 26,0 | 120 | 14 | 7 | 1,4 | 2,60 | 0,77 | 0,07 |

b) Parameters of non-intrinsically safe circuits.

„input” - terminals 5-6 and „supply” - terminals 7-8: $U_m=250V$.

5. Power supply type S2Ex-Supply.

Powers the device in a hazardous area.

a) Intrinsically safe, the power output circuit (terminals 1-2) : $C_i=0$, $L_i=0$
values L_o i C_o should be adopted according to the table shown below:

| Option | Po[W] | Uo[V] | Io[mA] | L _{max} [mH] | | | C _{max} [μF] | | |
|--------------------------|-------|--------------------------------------|--------|-----------------------|-----|-----|-----------------------|------|-------|
| | | | | IIA | IIB | IIC | IIA | IIB | IIC |
| U _{out} =0÷12V | 1,52 | U _{wyj} +8%U _{wyj} | 120 | 14 | 7 | 1,6 | 9,1 | 2,24 | 0,382 |
| U _{wyj} =12÷24V | 2 | U _{wyj} +8%U _{wyj} | 120 | 14 | 7 | 1,4 | 2,60 | 0,77 | 0,07 |

b) Parameters of non-intrinsically safe circuits.

„supply” - terminals 7-8: $U_m=250V$.

6. Repeater Power Supply type S2Ex-Z.

Powers and converts the signal from the 2-wire 4-20mA transducers installed in the hazardous area for any current or voltage signal.

a) Intrinsically safe power supply – measuring input (terminals 1-2) : $C_i=2$ nF, $L_i=0$
values L_o i C_o should be adopted according to the table shown below:

| Option | Po[W] | Uo[V] | Io[mA] | Lo[mH] | | | Co[μF] | | |
|--------|-------|-------|--------|--------|-----|-----|--------|------|-------|
| | | | | IIA | IIB | IIC | IIA | IIB | IIC |
| 16V | 0,75 | 16,8 | 92 | 20 | 11 | 2,8 | 9,3 | 2,29 | 0,39 |
| 18V | | 18,9 | | | | | 6,39 | 1,60 | 0,20 |
| 20V | | 21 | | | | | 4,78 | 1,27 | 0,188 |
| 22V | | 23,1 | | | | | 3,67 | 1,02 | 0,08 |
| 24V | | 25,2 | | | | | 2,90 | 0,82 | 0,063 |



[13]

Annex

[14]

The Certificate of the WE KDB 04ATEX120 type examination

[15] Description: continued

b) Parameters of non-intrinsically safe circuits.

„output” - terminals 5-6 and „supply” - terminals 7-8: $U_m=250V$.

7. Transducer type S2Ex-F.

Powers and converts the signal from transmitters installed in the hazardous area, generating a string (wave) pulses to any current or voltage signal.

a) The intrinsically safe input circuits (**terminals 1, 2, 3, 4**) : $C_i=0nF$, $L_i=0$

values L_o i C_o should be adopted according to the table shown below:

| Option | Po[W] | Uo[V] | Io[mA] | Lo[mH] | | | Co[μF] | | |
|--------|-------|-------|--------|--------|-----|-----|--------|------|-------|
| | | | | IIA | IIB | IIC | IIA | IIB | IIC |
| 8,2V | 0,1 | 8,6 | 14 | 100 | 100 | 100 | any | 55 | 6,2 |
| 12V | 0,75 | 12,6 | 92 | 20 | 11 | 2,8 | 27 | 7,4 | 1,15 |
| 16V | | 16,8 | | | | | 9,3 | 2,29 | 0,39 |
| 18V | | 18,9 | | | | | 6,39 | 1,60 | 0,2 |
| 20V | | 21 | | | | | 4,78 | 1,27 | 0,188 |
| 24V | | 25,2 | | | | | 2,90 | 0,82 | 0,063 |

b) The intrinsically safe input parameters - terminals „1, 2, 3”:

$U_i=30V$, $I_i=any$, $P_i=any$.

c) Parameters of non-intrinsically safe circuits.

„output” - terminals 5-6 and „supply” - terminals 7-8: $U_m=250V$.



[13]

Annex

[14]

The Certificate of the WE KDB 04ATEX120 type examination

Reports of studies:

[16]

Report No: KDB No 04.120

[17] **Special conditions of use:**

lacking

[18] **The essential requirements of safety and health:**

Completed by fulfilling the requirements of the standards listed in point 9 of this certificate.

[19] **The list of agreed documentation:**

Drawing numbers:

| | | | | |
|-----------------------------------|---------------------|-----------------------|----------------------------|---------------------|
| base board: | | | | |
| L04-S2Ex-2 | L04-S2Ex-3 | L04-S2Ex-3-1 | L04-S2Ex-4 (1, 2, 3) | L04-S2Ex-5 (1, 2) |
| L04-S2Ex-7 | L04-S2Ex-Tr | L04-S2Ex-Karkas | | |
| Separator S2Ex-SA: | | | | |
| L04-S2Ex-SA-2 | L04-S2Ex-SA-3 | L04-S2Ex-SA-3-1 | L04-S2Ex-SA-4 (1, 2, 3) | L04-S2Ex-SA-5 |
| L04-S2Ex-SA-6 | L04-S2Ex-SA-7 | | | |
| Transducer S2Ex-U | | | | |
| L04-S2Ex-U-2 | L04-S2Ex-U-3 | L04-S2Ex-U-3-1 | L04-S2Ex-U-4 (1, 2, 3) | L04-S2Ex-U-5 (1, 2) |
| L04-S2Ex-U-6(1, 2) | L04-S2Ex-U-7 | | | |
| Transducer S2Ex-R | | | | |
| L04-S2Ex-R-2 | L04-S2Ex-R-3 | L04-S2Ex-R-3-1 | L04-S2Ex-R-4 (1, 2, 3) | L04-S2Ex-R-5 (1, 2) |
| 0L04-S2Ex-R-6 (1, 2) | L04-S2Ex-R-7 | | | |
| Separator S2Ex-SB | | | | |
| L04-S2Ex-SB-2 | L04-S2Ex-SB-3 | L04-S2Ex-SB-3-1 | L04-S2Ex-SB-4 (1, 2, 3) | L04-S2Ex-SB-5 |
| L04-S2Ex-SB-6 | L04-S2Ex-SB-7 | | | |
| Power supply S2Ex-Supply | | | | |
| L04-S2Ex-Zasilacz-2 | L04-S2Ex-Zasilacz-3 | L04-S2Ex-Zasilacz-3-1 | L04-S2Ex-Zasilacz-4 (1, 2) | |
| L04-S2Ex-Zasilacz-4G (1, 2, 3, 4) | L04-S2Ex-Zasilacz-6 | L04-S2Ex-Zasilacz-7 | | |
| Repeater Power Supply S2Ex-Z | | | | |
| L04-S2Ex-Z-2 | L04-S2Ex-Z-3 | L04-S2Ex-Z-3-1 | L04-S2Ex-Z-4 (1, 2, 3) | L04-S2Ex-Z-5 |
| L04-S2Ex-Z-6 | L04-S2Ex-Z-7 | | | |
| Transducer S2Ex-F | | | | |
| L04-S2Ex-F-2 | L04-S2Ex-F-3 | L04-S2Ex-F-3-1 | L04-S2Ex-F-4 (1, 2, 3) | L04-S2Ex-F-5 (1, 2) |
| L04-S2Ex-F-6 (1, 2, 3) | L04-S2Ex-F-7 | | | |