

(1) EC-TYPE EXAMINATION CERTIFICATE

(2) Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC

- (3) EC-Type Examination Certificate Number: **KEMA 04ATEX1078** Issue Number: 2
- (4) Equipment: **Programmable Measurement Converter Model TPI-SI..., Model DS-SI..., Model μ C-SI... and Model DAS-SI...**
- (5) Manufacturer: **Ardetem-Sfere**
- (6) Address: **Route de Brindas, Parc d'Activité d'Arbora N° 2, 69510 Soucieu en Jarrest, France**
- (7) This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.
- (8) KEMA Quality B.V., notified body number 0344 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the directive.
- The examination and test results are recorded in confidential test report number 212193200-1.
- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
- | | | |
|--------------------------|---------------------------|---------------------------|
| EN 60079-0 : 2006 | EN 60079-11 : 2007 | EN 60079-26 : 2007 |
| EN 61241-0 : 2006 | EN 61241-11 : 2006 | |
- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.
- (11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment according to the Directive 94/9/EC. Further requirements of the directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.
- (12) The marking of the equipment shall include the following:



II (1) GD [Ex ia] IIC and [Ex iaD]

This certificate is issued on January 4, 2010 and, as far as applicable, shall be revised before the date of cessation of presumption of conformity of (one of) the standards mentioned above as communicated in the Official Journal of the European Union.

KEMA Quality B.V.

C.G. van Es
Certification Manager



(13) **SCHEDULE**

(14) **to EC-Type Examination Certificate KEMA 04ATEX1078**

Issue No. 2

(15) **Description**

Programmable Measurement Converter Model TPI-SI..., Model DP-SI..., Model μ C-SI... and Model DAS-SI... is used to convert the measurement signal of intrinsically safe field equipment as a transmitter, a thermocouple or an RTD, a voltage source or frequency (switch contact or NAMUR), into one or two current signals, a serial communication signal and/or contact outputs.

The converter is located outside the hazardous area.

Ambient temperature range -10 °C to +50 °C.

Electrical data

Non-intrinsically safe circuits

Supply (terminals A1, A3):	90 ... 265 Vac or 88 ... 375 Vdc, 20 ... 40 Vac or 20 ... 64 Vdc $U_m = 265 \text{ Vac}$
Current outputs (terminals S1, S2 and S3, S4):	0 ... 20 mA $U_m = 250 \text{ Vac}$
Relay outputs (terminals S3, S4 and S5, S6):	$U = 250 \text{ Vac}$, max. 5 A ac $U_m = 250 \text{ Vac}$
Serial output (terminals S1, S2):	RS 485 $U_m = 250 \text{ Vac}$

Intrinsically safe circuits

Input circuit (terminals E2, E5):

in type of protection intrinsic safety Ex ia IIC respectively Ex iaD, with following maximum values:
 $U_o = 23,1 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 578 \text{ mW}$; $C_o = 138 \text{ nF}$; $L_o = 4 \text{ mH}$.

Input circuits (terminals E1, E3 or E2, E3 or E4, E3 or terminals E1, E4 or E2, E4 with respect to E3):

in type of protection intrinsic safety Ex ia IIC respectively Ex iaD, with following maximum values:
 $U_o = 6,5 \text{ V}$; $I_o = 20,3 \text{ mA}$; $P_o = 33 \text{ mW}$; $C_o = 25 \text{ }\mu\text{F}$; $L_o = 85 \text{ mH}$.

Input circuit (terminals E1, E4 or E2, E4):

in type of protection intrinsic safety Ex ia IIC respectively Ex iaD, with following maximum values:
 $U_o = 13,0 \text{ V}$; $I_o = 4,7 \text{ mA}$; $P_o = 16 \text{ mW}$; $C_o = 1 \text{ }\mu\text{F}$; $L_o = 1,6 \text{ H}$.

Input circuit (terminals E1 and E2):

in type of protection intrinsic safety Ex ia IIC respectively Ex iaD, with following maximum values:
 $U_o = 9,6 \text{ V}$; $I_o = 11,7 \text{ mA}$; $P_o = 29 \text{ mW}$; $C_o = 3,6 \text{ }\mu\text{F}$; $L_o = 200 \text{ mH}$.

The intrinsically safe circuits are infallibly galvanically isolated from the non-intrinsically safe circuits up to peak voltage of 375 V.

Installation instructions

The manual provided with the equipment shall be followed in detail to assure safe operation.

(13) **SCHEDULE**

(14) **to EC-Type Examination Certificate KEMA 04ATEX1078**

Issue No. 2

(16) **Test Report**

KEMA No. 212193200-1.

(17) **Special conditions for safe use**

None.

(18) **Essential Health and Safety Requirements**

Covered by the standards listed at (9).

(19) **Test documentation**

As listed in Test Report No. 212193200-1.

Test Report No. 212193200-1

**Programmable Measurement Converter
Model TPI-SI..., Model DS-SI...,
Model μ C-SI... and Model DAS-SI...**

Laboratory: **KEMA Quality B.V.**
Utrechtseweg 310
6812 AR Arnhem
The Netherlands

By order of: **Ardetem-Sfere**
Route de Brindas
Parc d'Activité d'Arbora N° 2
69510 Soucieu en Jarrest
France

Author	: E. Giusti	2009-11-21	Reviewer	: C.G. van Es	2010-01-04
KEMA Project No. : 212193200					

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KEMA Quality B.V. and/or its associated companies disclaim liability for any direct, indirect, consequential or incidental damages that may result from the use of the information or data, or from the inability to use the information or data.

This Test Report contains the test results related to the sample(s) tested. The tests results cannot be used for any statement related to the quality of the equipment from running production.

1 KEMA Project 206008800

1.1 Standards applied

EN 50014: 1997 + A1, A2
EN 50020: 2002
EN 50284: 1999

Followings standards were used as a guide:

draft IEC 61241-0 : 2002
draft IEC 61241-11 : 2002

The assessment of the equipment was conducted from July to September 2004

1.2 Description of the equipment

Programmable Measurement Converter Model TPI-SI... and DP-SI... is used to convert the measurement signal of intrinsically safe field equipment as a transmitter, a thermocouple or an RTD, or a voltage source, into one or two current signals, a serial communication signal and/or contact outputs.

The converter is located outside the hazardous area.

Ambient temperature range -5 °C ... +50 °C.

Electrical data

Non-intrinsically safe circuits

Supply (terminals A1, A3):	90 ... 265 Vac or 88 ... 375 Vdc, 20 ... 40 Vac or 20 ... 64 Vdc $U_m = 265 \text{ Vac}$
Current outputs (terminals S1, S2 and S3, S4):	0 ... 20 mA $U_m = 250 \text{ Vac}$
Relay outputs (terminals S3, S4 and S5, S6):	$U = 250 \text{ Vac}$, max. 5 A ac $U_m = 250 \text{ Vac}$
Serial output (terminals S1, S2):	RS 485 $U_m = 250 \text{ Vac}$

Intrinsically safe circuits

Input circuit (terminals E2, E5):
in type of protection intrinsic safety EEx ia IIC, with following maximum values:
 $U_o = 23,1 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 578 \text{ mW}$; $C_o = 138 \text{ nF}$; $L_o = 4 \text{ mH}$.

Input circuits (terminals E1, E3 or E2, E3 or E4, E3 or terminals E1, E4 or E2, E4 with respect to E3):
in type of protection intrinsic safety EEx ia IIC, with following maximum values:
 $U_o = 6,5 \text{ V}$; $I_o = 20,3 \text{ mA}$; $P_o = 33 \text{ mW}$; $C_o = 25 \text{ }\mu\text{F}$; $L_o = 85 \text{ mH}$.

Input circuit (terminals E1, E4 or E2, E4):

in type of protection intrinsic safety EEx ia IIC, with following maximum values:

$U_o = 13,0 \text{ V}$; $I_o = 4,7 \text{ mA}$; $P_o = 16 \text{ mW}$; $C_o = 1 \mu\text{F}$; $L_o = 1,6 \text{ H}$.

The intrinsically safe circuits are infallibly galvanically isolated from the non-intrinsically safe circuits up to peak voltage of 375 V.

1.3 Marking of the equipment



II 1 G D [EEx ia] IIC

1.4 Test documentation

		<u>dated</u>
1.	Description, rev. D (12 pages)	14.05.2004
2.	Document	
	Plan mécanique AMBBTB40_3	19.12.2003
	Transformer E16-SI (90 - 265 V), rev. D	25.02.2004
	Transformer E16-SI (20 - 64 V), rev. D	25.02.2004
	Schematic diagram MCSI2RA3, rev. D (5 sheets)	12.05.2004
	PCB lay-out mC-SI-2RA-A3 (4 sheets)	14.05.2004
	PCB lay-out mC-SI-2RA-B3 (3 sheets)	14.05.2004
	Schematic diagram MCSI2NA02, rev. B (5 sheets)	06.05.2004
	PCB lay-out mC-SI-NA-A2 (4 sheets)	14.05.2004
	PCB lay-out mC-SI-NA-B2 (3 sheets)	14.05.2004
	Schematic diagram MCSI2NA02, rev. B (5 sheets)	23.04.2004
	PCB lay-out mC-SI-2A-A2 (4 sheets)	14.05.2004
	PCB lay-out mC-SI-2A-B2 (3 sheets)	14.05.2004
3.	Parts list	
	mC-SI-2RA (5 pages), rev. C	13.05.2004
	mC-SI-NA (5 pages), rev. B	14.05.2004
	mC-SI-2A (5 pages), rev. B	14.05.2004

2 KEMA Project No. 208657400

2.1 Standards applied

Unchanged.

The assessment of the equipment was conducted from 31 August 2005 to 21 November 2006.

2.2 Description of changes

Programmable Measurement Converters Model TPI-SI... and Model DS-SI... may also be manufactured in accordance with the Test Documentation listed in section 4. The changes concern the internal construction.

The range of Programmable Measurement Converters Model TPI-SI... and Model DS-SI... has been extended with versions with a frequency input (switch contact or NAMUR) with electrical data as listed below.

The ambient temperature range for all versions is -10 °C ... +50 °C.

Electrical data

Frequency input circuit (terminals E1 and E2), in type of protection intrinsic safety EEx ia IIC, with the following maximum values:

$U_o = 9,6 \text{ V}$, $I_o = 11,7 \text{ mA}$, $P_o = 29 \text{ mW}$, $C_o = 3,6 \text{ }\mu\text{F}$, $L_o = 200 \text{ mH}$.

The intrinsically safe input circuit is infallibly galvanically isolated from the non-intrinsically safe circuits up to a peak voltage of 375 V.

2.3 Marking of the equipment

Unchanged.

2.4 Test documentation

	<u>dated</u>
Notice Descriptive (14 pages)	04.01.2006
Document Transformer E16SI (90 - 265 V), rev. F	07.12.2004
Transformer E16SI (20 - 64 V), rev. F	07.12.2004
Schematic diagram MCSIF2RA6, rev. A (5 pages)	22.12.2005
Schematic diagram MCSIFNA4, rev. A (5 pages)	23.12.2005
Schematic diagram MCSI2A05, rev. E (5 pages)	25.01.2005
Schematic diagram MCSINA05, rev. E (5 pages)	27.01.2005
Schematic diagram MCSI2RA7, rev. G (5 pages)	01.03.2005
PCB and component lay-out MCSIF2RA6 (5 pages)	05.01.2006
PCB and component lay-out MCSIFNA4 (5 pages)	05.01.2006
PCB and component lay-out mC-SI-2A-A5/B5 (7 pages)	25.01.2005
PCB and component lay-out mC-SI-NA-A5/B5 (7 pages)	28.01.2005
PCB and component lay-out mC-SI-2RA-A7/B7 (7 pages)	02.03.2005

dated

Parts list	mC-SI-F-2RA#6, rev. A (4 pages)	05.01.2006
	mC-SI-F-NA#4, rev. A (4 pages)	05.01.2006
	mC-SI-2A A5 et B5, rev. E (5 pages)	25.01.2005
	mC-SI-NA A5 et B5, rev. E (5 pages)	27.01.2005
	mC-SI-2RA7, rev. G (5 pages)	02.03.2005

3 KEMA Project No. 212193200

3.1 Standards applied

EN 60079-0: 2006
EN 60079-11: 2007
EN 60079-26: 2007
EN 61241-0: 2006
EN 61241-11: 2006

The assessment was conducted from November 26, 2008 to November 6, 2009.

3.2 Description of changes

The following changes have been assessed:

- Modification of the name of the company into Ardetem-Sfere;
- addition of Programmable Measurement Converters Model μ C-SI... and Model DAS-SI... with identical construction and electrical data and previously manufactured by Sfere;
- compliance of the equipment with the EN 60079 and EN 61241 series standards;
- the intrinsically safe circuits are also suitable for type of protection Ex iaD, with application of the same parameters.

3.3 Marking of the equipment



II (1) GD [Ex ia] IIC and [Ex iaD]

3.4 Test documentation

dated

Notice Descriptive du TPI-SI, μ C-SI, DS-SI et DAS-SI, rev. G (14 pages) 2008-10-27

4 Routine tests

Each transformer shall be subjected to an electric strength test according to EN 60079-11, clause 11.2, between the primary windings and the windings supplying the intrinsically safe circuits, using a voltage of 2500 Vac during one minute, without breakdown.

5 Instructions for installation and use

The manual provided with the equipment shall be followed in detail to assure safe operation.

6 Test results

The detailed test results are laid down in confidential files no. 206008800, 207634000, 208657400, 208657600 and 212193200. There were no deviations from, additions to or exclusions from the applicable test methods as described in the standards mentioned under 1.1 and 3.1. Where applicable, the estimated uncertainty of measurement meets the requirements of IECEx Operational Document OD012.

7 Conclusion

The equipment as described under 1.2, 2.2 and 3.2 meets all applicable requirements of the standards as mentioned under 1.1 and 3.1. Continued certification of this equipment is therefore recommended.

Author:



E. Giusti

Reviewer:



C.G. van Es

Endorsed on January 4, 2010 by



C.G. van Es
Certification Manager

END OF TEST REPORT