1 **TYPE EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: **Sira 09ATEX3089** Issue: **3**

4 Equipment: **500 Series Digital Positioners**

5 Applicant: **Flowserve Corporation**

6 Address: 1350 North Mountain Springs Parkway,
Springville
UTAH
84663
USA

7 This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service certifies that this equipment has been found to comply with the Essential Health and Safety Requirements that relate to the design of Category 3 equipment, which is intended for use in potentially explosive atmospheres. These Essential Health and Safety Requirements are given in Annex II to European Union Directive 94/9/EC of 23 March 1994.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule of this certificate, has been assessed by reference to:

EN 60079-0:2006 EN 60079-11:2007 EN 61241-11:2006
IEC 60079-0:2007 was used as guidance in respect of marking

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 TYPE EXAMINATION CERTIFICATE relates only to the design of the specified equipment, and not to specific items of equipment subsequently manufactured.

12 The marking of the equipment shall include the following:

II 3 GD
Ex ic IIC T* Gc
Ex icD T120°C Dc Ta = -40°C to +85°C
All models except 500 MD:
T4 for -40°C ≤ Ta ≤ +85°C
T5 for -40°C ≤ Ta ≤ +55°C
T6 for -40°C ≤ Ta ≤ +40°C
Model 500 MD:
T5 for -40°C ≤ Ta ≤ +85°C
T6 for -40°C ≤ Ta ≤ +40°C

Project Number 26486

D R Stubbings BA MIET
Certification Manager

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13 **DESCRIPTION OF EQUIPMENT**

The 500 Series Digital Positioners consist of several models including 505, 510, 520, 520si, 520SD, 520MD, 521MD and 522MD. The majority of the hardware is shared between several models with the only difference being embedded software.

Model 505 is identical to the Model 510 with three deviations. Model 505 has a reduction in configuration functionality, cannot supply analog outputs and cannot be supplied with external proximity switches or the ability to supply analog outputs.

Models 520 and 520si add HART communications to the functionality of the Model 510.

Models 520MD, 521MD and 522MD add diagnostic functionality which require the addition of a pressure sensor.

The Model 500 Series consist of a piezo-electric controlled single- or dual-acting positioner mounted inside either an epoxy or polyester painted cast aluminium enclosure with visual access to LEDs.

The digital positioner consists of the following:

- Main circuit board
- Optional Communication Board
- Piezo Relay
- Hall Effect Sensor
- Feedback Potentiometer
- Connectors to two, external limit switches, component-certified per the table below

The main circuit board is partially encapsulated and mounted under the main cover for easy access to configuration and calibration circuitry during installation. The 500 Series provides 4 to 20 mA outputs with an option for HART communications protocol.

Logix Series 500 si Digital Positioners connect to a selection of external Pepperl & Fuchs proximity limit switches as summarised in the table below:

Switch Name	Ui	Ii	Pi	Ci	Li	Certificate Number
Cherry DG Mechanical Switch	28 V	45 mA	315 mW	1 nF	1 µH	Simple apparatus
Cherry DG Subminiature Switch	28 V	45 mA	315 mW	1 nF	1 µH	Simple apparatus
Hamlin 59045 Reed Proximity Switch	10.6 V	29.7 mA	79 mW	1 nF	1 µH	Simple apparatus
Pepperl & Fuchs Namur Proximity Switch NJ2-V3-N	16 V	52 mA	169 mW	40 nF	50 µH	PTB 00ATEX2032X
Pepperl & Fuchs Namur Proximity Switch SJ2-SN	16 V	52 mA	169 mW	30 nF	100 µH	PTB 00ATEX2049X
Pepperl & Fuchs Namur Proximity Switch NJ2-V3-N	16 V	52 mA	169 mW	30 nF	100 µH	PTB 00ATEX2049X
Pepperl & Fuchs Namur Proximity Switch NJ2-V3-N	16 V	52 mA	169 mW	30 nF	100 µH	PTB 99ATEX2219X

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SCHEDULE

TYPE EXAMINATION CERTIFICATE **Sira 09ATEX3089**
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Intrinsic Safety Parameters for Logix 500-Series digital positioners:

(T11-12) or Terminals used when AO options are installed.

Um	=	30 V
Ui	=	30 V
Ii	=	100 mA
Pi	=	800 mW
Li	=	0
Ci	=	20 nF

Ci = filters fitted at the terminal blocks

Variation 1 - This variation introduced the following change:

i. The introduction of minor, constructional changes to enhance manufacturability.

Variation 2 - This variation introduced the following changes:

i. The product was assessed to demonstrate compliance with the requirements of the Dust standard EN 61241-11:2006, which is added to the list of standards in Section 9, and the markings in section 12 were updated accordingly.

Variation 3 - This variation introduced the following changes:

i. The recognition of minor drawing modifications; including instructions for painting the casting, these amendments are administrative or involve changes to the design that do not affect the aspects of the product that are relevant to explosion safety.
ii. The recognition of the use of an Alternate Paint Coating was approved.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report number	Comment
0	15 June 2009	R51A19606A	The release of the prime certificate.
1	08 January 2010	R20811A	The introduction of Variation 1.
2	25 August 2011	R25349A/00	The introduction of Variation 2.
3	19 April 2012	R26486A/00	The introduction of Variation 3.

15 SPECIAL CONDITIONS FOR SAFE USE

None

16 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed reports listed in Section 14.2.

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SCHEDULE

TYPE EXAMINATION CERTIFICATE **Sira 09ATEX3089**
Issue 3

17 **CONDITIONS OF CERTIFICATION**

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.

17.2 Holders of Type Examination Certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.

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Certificate Annexe

Certificate Number: **Sira 09ATEX3089**

Equipment: **500 Series Digital Positioners**

Applicant: **Flowserve Corporation**

Issue 0

Drawing No.	Sheets	Rev.	Date (Sira stamp)	Title
Enclosure/Markings				
255004	1 of 1	1	01 Jun 09	Nameplate 500 MD ATEX
214011	1 of 1	5	01 Jun 09	Nameplate 500 si ATEX
Model 520MD				
245118	1 to 5	1	01 Jun 09	Schematic, Main Board
245119	1 to 11	0	01 Jun 09	Trace Layout, Main Board
245120	1 to 3	A	01 Jun 09	PCBA Logix 520MD Main Board
245120.000.000	1 to 17	4	01 Jun 09	BOM, Main Board
221868	1 of 1	0	01 Jun 09	Schematic, Piezo Relay
228005	1 of 1	0	01 Jun 09	Schematic, Pressure Sensor Board, 520IQ
228006	1 to 8	0	01 Jun 09	Trace Layout, Pressure Sensor Board, 520IQ
225204	1 to 3	1	01 Jun 09	PCBA Logix 520MD Pressure Sensor Board
255204.000.000	1 to 4	0	01 Jun 09	BOM, Pressure Sensor Board
245122	1 of 1	1	01 Jun 09	Schematic, Config Board
245123	1 to 7	0	01 Jun 09	PCB, Config Board
245124	1 to 3	0	01 Jun 09	PCBA Logix 520MD Config Board
245124.000.000	1 to 4	3	01 Jun 09	BOM, Config Board
Drawings Shared by All models				
218797	1 of 1	1	14 Sep 04	Piezo Chip -20C, -40C
217137	1 of 1	0	13 Aug 04	Piezo Chip, -40C
179335	1 to 4	1	16 Dec 02	Hall Sensor Board
179336	1 of 1	2	01 Jun 09	Hall Effect Sensor Assy
185959	1 of 1	0	16 Dec 02	Hall Sensor Schematic
1039075	1 of 1	-	16 Dec 02	Piezoinheit Kunststoff
D2-24	1 of 1	2	07 Mar 08	PMV Positioner Cover D2
D2-2(XX)	1 of 1	6	07 Mar 08	PMV Positioner Housing D2
178350	1 to 2	0	16 Dec 02	PCB Cover
Models 505, 510				
188138	1 to 2	1	5 Aug 02	PCBA, Logix 510, Top Assy Dwg without AO
188138.000.000	1 to 17	4	29 Dec 06	BOM, Logix 510 without AO
186507	1 to 2	1	5 Jan 02	PCBA, Logix 510, Top Assy Dwg with AO
186507.000.000	4 to 13	4	14 Dec 05	BOM, Logix 510 with AO
190709.000.000	1 to 9	1	10 Oct 02	BOM, Model 510 without AO
190710	1 to 2	6	07 Mar 08	Schematic, 510 Main Board, without Analog Output
181277	1 to 2	6	07 Mar 08	Schematic, 510 Main Board with Analog Output
181278	4 through 9 of 11	2	02 01 04	Trace Layout, 505/510 Main Board
Models 520, 520si, 520IQ, 520SD				
D2-14-R21	Copper layer 1	1	16 Jan 04	Switch Board D2/500 si Trace Layout
D2-14-R21	Copper layer 2	1	16 Jan 04	Switch Board D2/500 si Trace Layout
D2-14-R21	Silkscreen layer 1	1	16 Jan 04	Switch Board D2/500 si Trace Layout

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Drawing No.	Sheets	Rev.	Date (Sira stamp)	Title
214454	1 to 3 of 3	4	07 Mar 08	PCBA 520 Main Board
214454.000.000	1 to 12 of 12	4	26 Apr 06	Bill of Material 520 Main Board
214456	1 of 1	0	26 Apr 05	Schematic 520 Main Board
214457	1 to 11 of 11	0	26 Apr 05	PCB 520IQ HART Board
214458	1 to 3 of 3	1	07 Mar 08	PCBA 520IQ HART Board
214458.000.000	1 to 5 of 5	0	26 Apr 06	Bill of Materials 520IQ HART Board
214460	1 to 3 of 3	5	07 Mar 08	Schematic 520IQ Main Board
214461	1 to 11 of 11	4	07 Mar 08	PCB 520IQ Main Board
221942	1 to 2 of 2	2	07 Mar 08	PCBA, Logix 510SI Top Assy Dwg with AO
221942.000.000	1 to 21 of 21	3	07 Mar 08	BOM, Logix 510SI with AO
221943	1 of 1	3	15 Jan 09	PCBA, Logix 510SI Top Assy Dwg without AO
221943.000.000	1 to 18 of 18	4	07 Mar 08	BOM, Logix 510SI without AO

Issue 1

Drawing No.	Sheets	Rev.	Date (Sira stamp)	Title
Enclosure/Markings				
255004	1 of 1	4	21 Oct 09	Nameplate 500 MD ATEX
214011	1 of 1	7	21 Oct 09	Nameplate 500 si ATEX
Model 520MD				
255446	1 of 1	0	21 Oct 09	Schematic Logix 520MD Analog Output Board
255447	1 to 9	0	21 Oct 09	Trace Layout Logix 520MD Analog Output Board
255448	1 to 3	0	21 Oct 09	PCBA Logix 520MD Analog Output Board
255084	1 of 1	1	21 Oct 09	Wire Harness Logix 520MD AO Board
255448.000.000	1 to 4	0	21 Oct 09	BOM Logix 520MD Analog Board
245124	1 to 3	1	21 Oct 09	PCBA Logix 520MD Config Board
245123	1 to 7	2	21 Oct 09	Trace Layout Logix 520MD Config Board
245120	1 to 3	1	21 Oct 09	PCBA Logix 520MD Main Board
245120.000.000	1 to 29	5	21 Oct 09	BOM Logix 520MD Main Board
Piezo				
217137	1 of 1	1	21 Oct 09	Piezo Chip, -40 to 80C, Logix positioner

Issue 2

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
214011	1 of 1	9	03 Aug 11	Nameplate, Logix 500Si
255004	1 of 1	6	03 Aug 11	Nameplate, Logix 500MD

Issue 3

Drawing No.	Sheets	Rev.	Date (Sira stamp)	Title
262726	1 of 1	0	26-Feb-03	Cover, Main Housing Painted Black Logix 500
255170	1 of 1	0	26-Feb-03	Cover, Main Housing Painted White Logix 500
262727	1 of 1	0	26-Feb-03	Cover, Main Housing Painted Yellow Logix 500
255156	1 of 1	0	26-Feb-03	Housing, NPT Painted Black Logix 500
262677	1 of 1	0	19-Nov-09	Housing, M20 Painted Black Logix 500

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Certificate Annexe

Certificate Number: **Sira 09ATEX3089**

Equipment: **500 Series Digital Positioners**

Applicant: **Flowserve Corporation**

The following drawings have been revised

Drawing No.	Sheets	Rev.	Date (Sira stamp)	Title
Enclosure/Markings				
Model 520MD				
255204	1 to 3	3	09 Oct 09	PCBA Logix 520MD Pressure Sensor Board
Drawings Shared by All models				
255171	1 of 1	1	08 Oct 09	Cover, Main Housing, Machined
255157	1 of 1	0	11 Nov 02	Housing, Machined, NTP, Logix 500
262679	1 of 1	0	11 Nov 02	Housing, Machined, Metric, Logix 500
Models 505, 510				
190710	1 to 2	8	09 Mar 10	Schematic, 510 Main Board, without Analog Output
181277	1 to 2	8	09 Mar 10	Schematic, 510 Main Board with Analog Output
181278	4 to 9 of 11	4	08 Mar 10	Trace Layout, 505/510 Main Board
Models 520, 520si, 520IQ, 520SD				
262648	1 to 13	0	03 Feb 10	Limit Switch Board Logix 500 **
214454.000.000	1 to 23	5	14 Nov 11	Bill of Material 520 Main Board
214458	1 to 3	2	16 Jan 09	PCBA 520IQ HART Board
214458.000.000	1 to 8	1	14 Nov 11	Bill of Materials 520IQ HART Board
221942	1 to 2	3	15 Jan 09	PCBA, Logix 510SI Top Assy Dwg with AO
221942.000.000	1 to 20	6	14 Nov 11	BOM, Logix 510SI with AO
221943.000.000	1 to 18	7	14 Nov 211	BOM, Logix 510SI without AO

The following drawings are replaced with other drawings as noted:

Drawing No.	Rev.	Title	Replaced by
225204	1	PCBA Logix 520MD Pressure Sensor Board	Correction should read 255204
1039075	-	Piezoinheit Kunststoff	217137 (Issue1)
D2-24	2	PMV Positioner Cover D2	255171
D2-2(XX)	6	PMV Positioner Housing D2	255157 and 262679
D2-14-R21	0	Switch Board D2/500 si Trace Layout	262648

The following drawing number and revision has been corrected:

Drawing No.	Rev.	Title	Correct Drawing Number	Rev
225204	1	PCBA Logix 520MD Pressure Sensor Board	255204	3

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