



1 **EU-TYPE EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU

3 Certificate Number: **Sira 03ATEX1510X** Issue: **10**

4 Equipment: **TEC 2000/TEC2 Valve Actuator, ECP 2000 Valve Actuator and RDM Remote Display Module**

5 Applicant: **Emerson Process Management Valve Automation Inc.**

6 Address: **19200 Northwest Freeway, Houston, Texas 77065 USA**

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

8 Sira Certification Service, notified body number 0518 in accordance with Articles 17 and 21 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

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 to this certificate, has been assured by compliance with the following documents:

EN 60079-0:2012/A11:2013 EN 60079-1:2014 EN 60079-31:2014

The above list of documents may detail standards that do not appear on the UKAS Scope of Accreditation, but have been added through Sira's flexible scope of accreditation, which is available on request.

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to Specific Conditions of Use identified in the schedule to this certificate.

11 This EU-Type Examination Certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

TEC 2000/TEC 2 and ECP 2000 Electric Valve Actuators (When thermal cut outs rated at 130°C are used):



II 2 GD
Ex db IIB T4 Gb
Ex tb IIIC T135°C Db IP68
Ta -20°C to +60°C

Or



II 2 GD
Ex db IIB + H₂ T4 Gb
Ex tb IIIC T135°C Db IP68
Ta -20°C to +60°C

TEC 2000/TEC 2 and ECP 2000 Electric Valve Actuators (When thermal cut outs rated at 115°C are used):



II 2 GD
Ex db IIB 120°C (T4) Gb
Ex tb IIIC T120°C Db IP68
Ta -20°C to +60°C

Or



II 2 GD
Ex db IIB + H₂ 120°C (T4) Gb
Ex tb IIIC T120°C Db IP68
Ta -20°C to +60°C

RDM Module



II 2 GD
Ex db IIB + H₂ T6 Gb
Ex tb IIIC T85°C Db IP68
Ta -20°C to +60°C

Project Number 70124010

N Jones
Certification Manager

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13 DESCRIPTION OF EQUIPMENT

TEC2000 and ECP 2000 Electric Valve Actuators: The TEC2000 and ECP 2000 Electric Valve Actuators are self-contained electromechanical devices designed to operate various type of valves and multi-turn damper drives. TEC 2000 and ECP 2000 are mechanically identical machines. The TEC 2000 limit position sensing is conducted using a Hall Effect Absolute Position Encoder, whereas the ECP 2000 position sensing is conducted by intermitting gear trains operating double-make double-break precision switches.

The TEC2000 and ECP 2000 Electric Valve Actuators consist of three interconnected assemblies: gear housing assembly, electronics enclosure and motor enclosure. There is no flamepath construction difference between the TEC2000 and ECP 2000 Valve Actuators. Also available as a separate assembly option is the RDM Remote Display Module. The EEx d IIB and the EEx d IIB+H₂ valve actuators use different bolts to secure the electronics enclosure to the motor enclosure and to the gear housing assembly, in addition, the gear and torque limit assemblies used between the electronics enclosure and the gear housing assembly also differ.

The gear housing is cast from ductile iron. This housing contains the main drive gears, clutch lever and a handwheel for manual operation of the output drive. The clutch lever controls the output drive to be engaged either electrically (motor driven) or by the manual handwheel. When the clutch lever is in the "MOTOR" position, the manual handwheel is disengaged and does not move when the actuator is operated electrically. The gear housing is bolted to the electronics enclosure using (4) 3/8-16 UNC steel bolts and to the motor enclosure using (4) 3/8-16 UNC stainless steel bolts.

The electronics enclosure is cast from aluminum, ductile iron or bronze. The enclosure includes (1) extended and (3) shallow spigot bolt-on covers each using (4) M8-1.25 stainless steel bolts. One LDM cover, located on one end of the enclosure, includes a tempered lime glass viewing window and control/selector handles that do not penetrate the cover wall. The tempered lime glass viewing window is cemented to the cover using A-271 epoxy material. The extended cover on the other end of the enclosure includes (3) 1-NPT and (1) 1½-NPT conduit openings for field wiring connections. The extended cover includes a threaded blank cover. The electronics enclosure is bolted to the gear housing using (4) 3/8-16 UNC steel bolts and to the motor enclosure using (4) 1/4-20 UNC stainless steel bolts. For EEx d IIB+H₂ rating, the 1/4-20 UNC and 3/8-16 UNC bolts and the gear and torque limit assemblies between the gear housing and electronics enclosure form spigot type flamepaths (cylindrical portion formed between the bolt/limit assemblies and enclosure and flanged portion between the gear housing and electronics enclosure). Whereas for EEx d IIB rating, only a flanged joint is present between the electronics enclosure and motor enclosure, and between the electronics enclosure and gear housing. O-rings are provided between the enclosure and bolt-on covers, between the threaded cover and extended cover, as well as between the interconnection of the electronics enclosure, the gear housing and the motor enclosure. The free internal volume for the motor enclosure is 308 in³ (5047 cm³).

The motor enclosure consists of cold rolled steel and aluminum end caps. Supply voltage to the motors is 115/208/220/230 V, 50/60 Hz, single phase, 208/230/380/415/460/575 V, 50/60 Hz, three phase, or 12/24/48/125/250 Vdc with a horsepower range of 1/60 to 8. The motors contain (2) thermal cutout switches, rated at either 130°C ±5°C with a T4 temperature code marking or 115°C ±5°C with a 120°C (T4) temperature code marking, these are wound into the motor stator. The motor enclosure bolts to the electronics enclosure using (4) 1/4-20 UNC stainless steel bolts and to the gear housing using (4) 3/8-16 UNC stainless steel bolts. The wiring from the electronics enclosure to the motor enclosure is cemented using either Appleton "Kwiko" or Crouse-Hinds "Chico A" sealing material. The free internal volume for the motor enclosure is 154 in³ (2524 cm³).



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The RDM module: The RDM module enclosure is cast from aluminium alloy and consists of a cover that bolts to the enclosure base using (4) M8-1.25 stainless steel bolts. The bolt-on cover for the RDM is of the same design (that has a cemented viewing window and control and selector handles) as the LDM cover used in the electronics enclosure. The enclosure contains (3) 1 inch NPT conduit openings. An O-ring is present between the enclosure base and bolt-on cover. The free internal volume for the RDM Module is 56 in³ (918 cm³).

Note This certificate covers the electrical equipment associated with the TEC 2000 and ECP 2000 Electric Valve Actuators and RDM Module and does not include any non-electrical equipment located outside the flameproof envelope.

Variation 1 - This variation introduced the following change:

- i. To recognise the change of the Applicant's name from EIM Company Inc to Emerson Process Management Valve Actuation, LLC.

Variation 2 - This variation introduced the following changes:

- i. The introduction of an alternative arrangement that utilises a Bartec line bushing (PTB 97 ATEX 1047 U, coded Ex d IIC). This bushing is an optional replacement for the Appleton 'Kwiko' or Cooper Crouse hinds 'Chico A' cement which separate the motor enclosure and the electronics enclosure.
- ii. Following appropriate re-assessment to demonstrate compliance with the requirements of the EN 60079 series of standards, the documents originally listed in section 9, EN 50014:1997 (amendment A1 and A2), EN 50018:2000 (amendment A1) and EN 50281-1-1:1999 were replaced by those currently listed, the markings in section 12 were updated accordingly. Special Conditions for Safe Use were introduced to recognise the requirements of the latest standards, accordingly the certificate number was amended to include an 'X' suffix.

Variation 3 - This variation introduced the following change:

- i. A label showing the details of a Distributor was acknowledged.

Variation 4 - This variation introduced the following change:

- i. The introduction of two, new Electro-Hydraulic Operator versions of the TEC 2000 Valve Actuator; as a result, the Special Conditions for Safe Use and Conditions of Certification were reviewed and revised. The new versions incorporate the following design changes:
 - **Version 1:** The Auxillary Control Module (ACM) is replaced by a Hydraulic Manifold Assembly (HMA) that is secured to the electronics enclosure by 4-off, M8 x 1.25, 316 stainless steel bolts and comprises a pressure sensor, pressure switch, pressure gauge and solenoid valves. In addition, the Absolute Position Detection module (APD) is replaced by an internal arrangement of contactors, an overload relay and an encoder assembly with limit switches; the introduction of this arrangement requires the covers to be modified. This version incorporates a Local Display Module (LDM).
 - **Version 2:** This Version incorporates the same changes as Version 1, however, the Local Display Module (LDM) used in the original Version and Version 1 is replaced by a Push Button Assembly and an associated cover.

Variation 5 - This variation introduced the following changes:

- i. To replace a Specific Condition For Use to specify that flameproof joints are not permitted to be repaired.



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- ii. To introduce the following additional schedule approval drawings omitted in error under the original IECEx certification and under previous ATEX variation:
 - 84500-CEN pages 38 and 38A
 - 84500-IECEx pages 33 and 33A
- iii. To recognize the latest EC type-examination certificate EPS 13ATEX1619U of Bartec line bushing type 07-9101-H03D replacing former certificate PTB 97ATEX1047U.
- iv. Following appropriate assessment to demonstrate compliance with the latest technical knowledge, EN 60079-0:2009, EN 60079-1:2007 and EN 60079-31:2009 were replaced by EN 60079-0:2012/A11:2013, EN 60079-1:2014 and EN 60079-31:2014, the Specific Conditions of Use, the Conditions of Manufacturing and the markings were amended as applicable to recognise the new standards.

Variation 6 - This variation introduced the following changes:

- i. To permit motor voltages up to 690 V ac.
- ii. To recognise changes to the model number codes table.

Variation 7 - This variation introduced the following change:

- i. The company name and address was changed:

From:	To:
Emerson Process Management Valve Actuation LLC	Emerson Process Management Valve Automation Inc
13840 Pike Road	19200 Northwest Freeway
Missouri City	Houston
Texas 77489 USA	Texas 77065 USA

Variation 8 - This variation introduced the following change:

- i. To permit modifications to internal Printed Circuit Boards collectively listed as TEC2 controls.

Variation 9 - This variation introduced the following changes:

- i. Update the product name to reflect the change of product from the TEC 2000 Valve Actuator to the TEC 2000/TEC2 Valve Actuator which contains replacement TEC2 electronics.
- ii. Update the marking to reflect the change of product from the TEC 2000 to the TEC 2000/TEC2.
- iii. Update drawings to remove reference to TEC 2000 and replace with TEC 2000/TEC2.
- iv. Update of the company name on drawings.
- v. Update all drawings to revision K.
- vi. Update LDM cover assembly with the removal of the jack screw holes, redesigned control/selector handles design and a redesigned mandrel.
- vii. Inclusion of an additional gear option in the documentation.

14 **DESCRIPTIVE DOCUMENTS**

14.1 **Drawings**

Refer to Certificate Annexe.

14.2 **Associated Sira Reports and Certificate History**

Issue	Date	Report number	Comment
0	29 January 2004	R53F10538B	The release of the prime certificate.

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Sira Certification Service

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Issue	Date	Report number	Comment
1	14 July 2004	N/A	Re-issued to replace the original certificate and report that were lost in transit.
2	9 March 2010	R21958A/00	This Issue covers the following changes: <ul style="list-style-type: none">All previously issued certification was rationalised into a single certificate, Issue 2, Issues 0 to 1 referenced above are only intended to reflect the history of the previous certification and have not been issued as documents in this format.The introduction of Variation 1.
3	8 December 2011	R25091A/00	The introduction of Variation 2, this required the addition of an 'X' suffix in the certificate number.
4	02 May 2013	R30666A/00	The introduction of Variation 3
5	16 July 2015	R70022523A	The introduction of Variation 4.
6	09 May 2016	R70056342A	This Issue covers the following changes: <ul style="list-style-type: none">EC Type-Examination Certificate in accordance with 94/9/EC updated to EU Type-Examination Certificate in accordance with Directive 2014/34/EU. <i>(In accordance with Article 41 of Directive 2014/34/EU, EC Type-Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Variations to such EC Type-Examination Certificates may continue to bear the original certificate number issued prior to 20 April 2016.)</i>The introduction of Variation 5.
7	13 July 2016	R70082307A	The introduction of Variation 6.
8	27 September 2016	R70078750A	The introduction of Variation 7.
9	31 January 2017	R70109918A	The introduction of Variation 8.
10	06 June 2017	R70124010A	The introduction of Variation 9.

15 **SPECIFIC CONDITIONS OF USE** (denoted by X after the certificate number)

15.1 All replacement fasteners shall meet the minimum requirements detailed below:

- The M8 fasteners used to secure each cover to the electronics enclosure and the RDM cover to the RDM enclosure shall be of property class (or 'grade') 8.8.
- The fasteners used to secure the motor enclosure to the electronics enclosure, the electronics enclosure to the gear box and the end caps to the motor frame shall of property class (or 'grade') 5.
- The HMA shall be secured to the electronics enclosure by M8 x 1.25, 316 stainless steel bolts.

In all of the above cases, when fasteners are fully tightened into the threaded holes without the use of a washer, at least one full thread shall remain free at the base of the hole

15.2 The flameproof joints shall not be repaired.

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II** (EHSRs)

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

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17 **CONDITIONS OF MANUFACTURE**

- 17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.
- 17.2 Holders of EU-Type Examination Certificates are required to comply with the conformity to type requirements defined in Article 13 of Directive 2014/34/EU.
- 17.3 Each Hydraulic Manifold Assembly shall be subjected to a routine overpressure of 4500 psig for a minimum period of 10 seconds; no damage, permanent deformation or leakage, other than through flameproof joints, is permitted.
- 17.4 The products covered by this certificate incorporate previously certified devices, it is therefore the responsibility of the manufacturer to continually monitor the status of the certification associated with these devices, and the manufacturer shall inform Sira of any modifications of the devices that may impinge upon the explosion safety design of their products.
- 17.5 The TEC 2000 Electro-Hydraulic Operator Versions shall only be marked IIB.
- 17.6 Suitably certified and rated metallic blanking elements shall be installed in the conduit entries.

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Certificate Annexe



Certificate Number: Sira 03ATEX1510X
Equipment: TEC 2000/TEC2 Valve Actuator, ECP 2000 Valve Actuator and RDM Remote Display Module
Applicant: Emerson Process Management Valve Automation Inc.

Issues 0 to 9. The drawings listed with these Issues were rationalised and have been superseded by those detailed in Issue 10

Issue 10 -

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
84500-CEN	1 of 45	K	05 May 17	Critical Documents List
84500-CEN	2 of 45	K	05 May 17	Critical Documents List
84500-CEN	3 of 45	K	05 May 17	Critical Documents List
84500-CEN	4 of 45	K	05 May 17	Critical Documents List
84500-CEN	5 of 45	K	05 May 17	Critical Documents List
84500-CEN	6 of 45	K	05 May 17	Critical Documents List
84500-CEN	6B of 45	K	05 May 17	Critical Documents List
84500-CEN	6C of 45	K	05 May 17	Critical Documents List
84500-CEN	6D of 45	K	05 May 17	Critical Documents List
84500-CEN	7 of 45	K	05 May 17	Critical Documents List
84500-CEN	7A of 45	K	05 May 17	Critical Documents List
84500-CEN	8 of 45	K	05 May 17	Critical Documents List
84500-CEN	9 of 45	K	05 May 17	Critical Documents List
84500-CEN	10 of 45	K	05 May 17	Critical Documents List
84500-CEN	11 of 45	K	05 May 17	Critical Documents List
84500-CEN	12 of 45	K	05 May 17	Critical Documents List
84500-CEN	13 of 45	K	05 May 17	Critical Documents List
84500-CEN	14 of 45	K	05 May 17	Critical Documents List
84500-CEN	15 of 45	K	05 May 17	Critical Documents List
84500-CEN	16 of 45	K	05 May 17	Critical Documents List
84500-CEN	17 of 45	K	05 May 17	Critical Documents List
84500-CEN	17A of 45	K	05 May 17	Critical Documents List
84500-CEN	18 of 45	K	05 May 17	Critical Documents List
84500-CEN	19 of 45	K	05 May 17	Critical Documents List
84500-CEN	20 of 45	K	05 May 17	Critical Documents List
84500-CEN	21 of 45	K	05 May 17	Critical Documents List
84500-CEN	21A of 45	K	05 May 17	Critical Documents List
84500-CEN	22 of 45	K	05 May 17	Critical Documents List
84500-CEN	22A of 45	K	05 May 17	Critical Documents List
84500-CEN	22B of 45	K	05 May 17	Critical Documents List
84500-CEN	23 of 45	K	05 May 17	Critical Documents List
84500-CEN	24 of 45	K	05 May 17	Critical Documents List
84500-CEN	25 of 45	K	05 May 17	Critical Documents List
84500-CEN	26 of 45	K	05 May 17	Critical Documents List
84500-CEN	27 of 45	K	05 May 17	Critical Documents List
84500-CEN	28 of 45	K	05 May 17	Critical Documents List
84500-CEN	28A of 45	K	05 May 17	Critical Documents List
84500-CEN	29 of 45	K	05 May 17	Critical Documents List
84500-CEN	30 of 45	K	05 May 17	Critical Documents List
84500-CEN	31 of 45	K	05 May 17	Critical Documents List

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Certificate Annexe



Certificate Number: Sira 03ATEX1510X
Equipment: TEC 2000/TEC2 Valve Actuator, ECP 2000
Valve Actuator and
RDM Remote Display Module
Applicant: Emerson Process Management Valve
Automation Inc.

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
84500-CEN	32 of 45	K	05 May 17	Critical Documents List
84500-CEN	33 of 45	K	05 May 17	Critical Documents List
84500-CEN	34 of 45	K	05 May 17	Critical Documents List
84500-CEN	35 of 45	K	05 May 17	Critical Documents List
84500-CEN	35A of 45	K	05 May 17	Critical Documents List
84500-CEN	36 of 45	K	05 May 17	Critical Documents List
84500-CEN	37 of 45	K	05 May 17	Critical Documents List
84500-CEN	38 of 45	K	05 May 17	Critical Documents List
84500-CEN	38A of 45	K	05 May 17	Critical Documents List
84500-CEN	39 of 45	K	05 May 17	Critical Documents List
84500-CEN	40 of 45	K	05 May 17	Critical Documents List
84500-CEN	41 of 45	K	05 May 17	Critical Documents List
84500-CEN	42 of 45	K	05 May 17	Critical Documents List
84500-CEN	43 of 45	K	05 May 17	Critical Documents List
84500-CEN	44 of 45	K	05 May 17	Critical Documents List
84500-CEN	45 of 45	K	05 May 17	Critical Documents List

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