



IECEX Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: IECEx SIR 12.0035X issue No.:2
Status: **Current**
Date of Issue: **2015-07-16** Page 1 of 4

Certificate history:
Issue No. 2 (2015-7-16)
Issue No. 1 (2013-5-15)
Issue No. 0 (2012-3-5)

Applicant: **Emerson Process Management Valve Actuation, LLC**
13840 Pike Road
Missouri City
Texas 77489
United States of America

Electrical Apparatus: **TEC 2000 Valve Actuator, ECP 2000 Valve Actuator and RDM Remote Display Module**
Optional accessory:

Type of Protection: **Flameproof and Dust protection by enclosure**

Marking: **RDM Module**
Ex d IIB + H2 T6 Gb
Ex tb IIIC T85°C Db IP68
Ta = -20°C to +60°C

TEC 2000 and ECP 2000 Electric Valve Actuators
When thermal cutouts rated at 130°C are used:
Ex d IIB T4 Gb
Ex tb IIIC T135°C Db IP68 or
Ex d IIB + H2 T4 Gb
Ex tb IIIC T135°C Db IP68
When thermal cutouts rated at 115°C are used:
Ex d IIB 120°C (T4) Gb
Ex tb IIIC T120°C Db IP68 or
Ex d IIB + H2 120°C (T4) Gb
Ex tb IIIC T120°C Db IP68
Ta = -20°C to +60°C

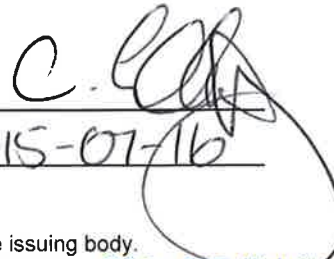
Approved for issue on behalf of the IECEx
Certification Body:

C Ellaby

Position:

Deputy Certification Manager

Signature:
(for printed version)



2015-07-16

Date:

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the [Official IECEx Website](http://www.iecex.com).

Certificate issued by:

SIRA Certification Service
CSA Group
Unit 6, Hawarden Industrial Park
Hawarden
Deeside
CH5 3US
United Kingdom

sira
CERTIFICATION



IECEx Certificate of Conformity

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Manufacturer:

Emerson Process Management Valve Actuation, LLC
13840 Pike Road
Missouri City
Texas 77489
United States of America

Additional Manufacturing location
(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Edition: 6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-1 : 2007-04 Edition: 6	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
IEC 60079-31 : 2008 Edition: 1	Explosive atmospheres – Part 31: Equipment dust ignition protection by enclosure 't'

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

[GB/SIR/ExTR12.0072/00](#)

[GB/SIR/ExTR13.0113/00](#)

[GB/SIR/ExTR15.0191/00](#)

Quality Assessment Report:

[GB/SIR/QAR06.0045/03](#)



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Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

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 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 (918cubic cm)

For the full description and Conditions of Manufacture, refer to the Annexe.

CONDITIONS OF CERTIFICATION: YES as shown below:

Refer to the Annexe.



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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Issue 1 – this Issue introduced the following changes:	
1.	A label showing the details of a Distributor was acknowledged.
Issue 2 – this Issue introduced the following changes:	
1.	The marking section was amended to retrospectively introduce the ambient temperature range as detailed in ExTR GB/SIR/ExTR12.0072/00.
2.	<p>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:</p> <ul style="list-style-type: none">• 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.

Annexe to: IECEx SIR 12.0035X Issue 2

Applicant: Emerson Process Management Valve Actuation, LLC

Apparatus: TEC 2000 Valve Actuator
ECP 2000 Valve Actuator
RDM Remote Display Module



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 TEC 2000 and ECP 2000 Valve Actuators. Also available as a separate assembly option is the RDM Remote Display Module. The Ex d IIB and the Ex 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 aluminium, 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 Ex 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 Ex 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 aluminium 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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Form 9530 Issue 1

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Annexe to: IECEx SIR 12.0035X Issue 2

Applicant: Emerson Process Management Valve Actuation, LLC

**Apparatus: TEC 2000 Valve Actuator
ECP 2000 Valve Actuator
RDM Remote Display Module**



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

Conditions of Certification

- i. 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

- ii. In some cases, the dimensions of the flameproof joints are other than the relevant minimum required by table 1 (for IIB) or table 2 (for IIB + H₂) of IEC 60079-1:2007, as detailed below:

TEC 2000 and ECP 2000 Valve actuators marked IIB:

Flamepath Description	Type of joint	Minimum Width 'L' (mm)		Maximum Gap i _c (mm)
Motor enclosure to electronics enclosure	Flanged	25		0.04
Motor enclosure body to motor enclosure end caps	Cylindrical	25		Interference fit (zero gap)
Motor enclosure end cap to motor shaft	Cylindrical (with ball bearing)	25		0.15
Gear housing to electronics enclosure	Flanged	26.7		0.04
Gear housing to electronics enclosure: Gear Limit (9GL) and Torque Limit (TL) cartridges	Spigot	Total	25	
		Flanged part	10.2	0.038
		Cylindrical part	15.2	0.18
Electronics enclosure to covers	Spigot joints	Total	29.2	
		Flanged part	8.9	0.038
		Cylindrical part	20.3	0.18
Electronics enclosure to STC extension	Spigot joint	Total	29.2	
		Flanged part	8.9	0.038
		Cylindrical part	20.3	0.18

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Applicant: Emerson Process Management Valve Actuation, LLC



**Apparatus: TEC 2000 Valve Actuator
ECP 2000 Valve Actuator
RDM Remote Display Module**

Flamepath Description	Type of joint	Minimum Width 'L' (mm)	Maximum Gap i_c (mm)
Gear limit (GL) cartridge and Gear Limit (GL) shaft	Cylindrical	25	0.08
Gear limit (GL) cartridge and Gear Limit (GL) shaft	Cylindrical for ECP only	33.2	0.08
Torque Limit (TL) Cartridge and Torque Limit (TL) shaft	Cylindrical	37.3	0.08

Gaps shall not be machined to be any larger than the values of ' i_c ', and widths shall not be modified to be any smaller than the values of 'L', shown in the table above.

TEC 2000 Electro-Hydraulic Operator Version marked IIB

In addition to values stated in the above table, the following gaps are also applicable the TEC 2000 Electro-Hydraulic Operator Versions.

Flamepath Description	Type of joint	Minimum Width 'L' (mm)	Maximum Gap i_c (mm)
Cover to enclosure (All models)	Spigot	Total	28.7
		Flanged part	8.89
		Cylindrical part	19.81
PB actuator assembly (PBM)	Spigot	14.22	0.08
SS lock handle assembly (PBM)	Cylindrical	15.75	0.08

Gaps shall not be machined to be any larger than the values of ' i_c ', and widths shall not be modified to be any smaller than the values of 'L', shown in the table above.

TEC 2000 and ECP 2000 Valve actuators marked IIB + H₂:

Flamepath Description	Type of joint	Minimum Width 'L' (mm)	Maximum Gap i_c (mm)
Motor enclosure to electronics enclosure	Spigot	Total	25
		Flanged part	10.2
		Cylindrical part	15.2
Motor enclosure body to motor enclosure end caps	Cylindrical	25	Interference fit (zero gap)
Motor enclosure end cap to motor shaft	Cylindrical (with ball bearing)	25	0.15
Gear housing to electronics enclosure	Bolts spigot joint	Total	31.7
		Flanged part	16.5
		Cylindrical part	15.2
Gear housing to electronics enclosure: Gear Limit (9GL) and Torque Limit (TL) cartridges	Spigot	Total	25
		Flanged part	10.2
		Cylindrical part	15.2
Electronics enclosure to covers	Spigot joints	Total	29.2
		Flanged part	8.9
		Cylindrical part	20.3
Electronics enclosure to STC extension	Spigot joint	Total	29.2
		Flanged part	8.9
		Cylindrical part	20.3
Gear limit (GL) cartridge and Gear Limit (GL) shaft	Cylindrical	25	0.08

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Applicant: Emerson Process Management Valve Actuation, LLC

**Apparatus: TEC 2000 Valve Actuator
ECP 2000 Valve Actuator
RDM Remote Display Module**



Flamepath Description	Type of joint	Minimum Width 'L' (mm)	Maximum Gap i_c (mm)
Gear limit (GL) cartridge and Gear Limit (GL) shaft	Cylindrical for ECP only	33.2	0.08
Torque Limit (TL) Cartridge and Torque Limit (TL) shaft	Cylindrical	37.3	0.08

Gaps shall not be machined to be any larger than the values of ' i_c ', and widths shall not be modified to be any smaller than the values of 'L', shown in the table above.

RDM Module only marked IIB + H₂:

Flamepath Description	Type of joint	Minimum Width 'L' (mm)	Maximum Gap i_c (mm)
Cover to enclosure	Spigot	Total	27.7
		Flanged part	8.8
		Cylindrical part	19.8

Gaps shall not be machined to be any larger than the values of ' i_c ', and widths shall not be modified to be any smaller than the values of 'L', shown in the table above.

Conditions of Manufacture

The Manufacturer shall comply with the following:

- i. 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.
- ii. 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.
- iii. The TEC 2000 Electro-Hydraulic Operator Versions shall only be marked IIB.

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