



EC TYPE-EXAMINATION CERTIFICATE

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

Certificate Number: **Sira 03ATEX1255X** Issue: **15**

Equipment: **IQT Range of Electric Valve Actuators**

Applicant: **Rotork Controls Ltd** **Rotork Controls Inc.**

Address: Brassmill Lane 675 Mile Crossing Blvd
Bath Rochester
England NY 14624
BA1 3JQ USA

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

Sira Certification Service, notified body number 0518 in accordance with Article 9 of 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 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.

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 60079-0:2009

EN 60079-1:2007

EN 60079-7:2007

EN 61241-1:2004

EN 13463-1:2009

EN 13463-5:2003

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.

This EC 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.

The marking of the equipment shall include the following:



II 2 G D c

Ex d • IIC T4 Gb

Ex tb IIIC T120°C Db IP68 ,

(- f °C to + „ °C)

• "e" added on versions with increased safety terminal enclosure

, Only IP6X is endorsed by Sira on this certificate

f Down to -50°C

„ Up to 70°C

Project Number 15000-068

C Ellaby
Deputy Certification Manager

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Sira Certification Service

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13 DESCRIPTION OF EQUIPMENT

The IQT Electric Actuator comprises an oil-filled spur/worm gearbox with handwheel and de-clutch mechanism, which is attached to an electrical enclosure and a terminal enclosure. Both these enclosures form an integral part of the gearcase and are designed to satisfy the requirements for flameproof equipment. The IQT Electric Actuator comprises a range of electric actuators based upon two gearcase sizes, the flameproof enclosures are constructionally identical on both gearcase sizes.

A permanent magnet dc motor is installed in the electrical enclosure by means of a motor cover, which has a spigoted flamepath joint and which is secured by three M8 capscrews. The rotary output from the motor transfers to the gearbox by means of a shaft supported in a rolling element bearing and a cylindrical brass flamepath bushing.

An electrical cover connects to the gearcase by means of a spigoted flamepath joint and is secured by four M8 capscrews. In one end of the electrical cover a window is provided to allow observation of an internal LCD display. As well as the motor, the electrical enclosure contains monitoring and control circuitry and a type PP3 back-up battery (permitted battery types are: Ultralife PP3 type U9VL, SAFT 3 x AA cells type NPS 02-018, Tadiran/Sonnenschein 3 x ½ AA cells type TL-5902) which is protected by an inline fuse (permitted fuse types are Quick blow Bussman TDS500, 100 mA, Quick Blow Littlefuse 217, 100 mA). The monitoring and control circuitry, controls the output speed and torque of the motor. It also senses and controls the position of the output shaft of the actuator by means of an encoder shaft. This shaft is supported in a rolling element bearing and transfers to the gearbox by means of a cylindrical brass flamepath bushing.

The terminal enclosure connects to the electrical enclosure via the gearcase. The terminal enclosure incorporates a terminal bung, which comprises of a moulded main body, through which passes a number of terminals that are moulded in place. The terminal enclosure provides all electrical field wiring terminations at the terminal bung. Cable entry facilities are provided in the form of two or four threaded entries. The terminal enclosure is closed by means of a terminal cover which connects to the gearcase by means of a tapered spigot flamepath joint and is secured by four M8 capscrews.

The equipment is fitted with thermal protective devices in either the toroid transformer for three phase and single phase actuators and on the rectifier for DC actuators. There is a facility to override these devices should the user find it necessary.

NOTE: The overriding of the temperature classification thermal protection devices is not covered by the scope of this certificate.

The following actuator options are covered by the scope of this report:

IQT125, IQT250 & IQT500

- Quarter turn and multi-turn output option (designated IQT or IQTF respectively)
- Three phase, single phase and dc actuator power supply
- Modulating output duty cycle option (designated IQTM or IQTFM)

IQT1000 & IQT2000

- Quarter turn and multi-turn output option (designated IQT or IQTF respectively)
- Three phase, single phase and dc actuator power supply
- Modulating output duty cycle option (designated IQTM or IQTFM)

Electrical Ratings

- 200 to 690 Vac, 3 phase, 50 or 60 Hz
- 100 to 240 Vac, single phase, 50 or 60 Hz
- 24 Vdc

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Design Options

Intumescent® coating option to the exterior of the actuators for fire proofing purposes.

The application of an outer, Intumescent® fire retardant coating can be applied to all sizes.

Fibre optic coupler module option – All actuator sizes

Applies to the terminal enclosures that are marked 'Ex d' only; it involves altering the terminal lid to allow the inclusion of a fibre optic coupler module.

Lightning suppression module option – All actuator sizes

Applies to terminal enclosures that are marked 'Ex d' only; it allows the inclusion of a lightning suppression module secured to the inner face of the existing terminal lid.

Deep terminal cover option – All actuator sizes

The deep terminal cover allows the installation of an assortment of equipment within the terminal enclosure on Ex d versions, typically a PCB for Profibus disconnect applications, a contactor, or a three phase mains filter. To allow the inclusion of additional circuitry, the deep cover is provided with threaded entry points to accommodate suitable, ATEX, Ex d cable entry devices that have been certified by a notified body.

Alternative Chinese manufactured flamepath components and transformers - All actuator sizes

The use of Chinese manufactured flamepath components, enclosure castings and toroidal transformers (fitted with Chinese manufactured thermostats).

Wireless network option - All actuator sizes

A wireless network fitted into a deep terminal cover and its associated aerial.

Variation 1 - This variation introduced the following change:

- i. The introduction of a Current Position Transmitter (CPT) circuit board into the equipment; this circuit enables the connection of an intrinsically safe circuit to terminals of the termination 'bun' and has the following input parameters:
 $U_i = 30\text{ V}$, $I_i = 660\text{ mA}$, $P_i = 2\text{ W}$, $C_i = 0$, $L_i = 0$
The terminal numbers for the intrinsically safe circuit can vary from one actuator model to another and are specified on the wiring diagram that accompanies each actuator.

Variation 2 - This variation introduced the following change:

- ii. The introduction of the following Modules:

Fibre Optic Coupler Module

This modification applies to terminal enclosures that are marked 'EEx d' only; it involves altering the terminal lid to allow the inclusion of a fibre optic coupler module within the terminal compartment.

Lightning Suppression Module

This modification applies to terminal enclosures that are marked 'EEx d' only; it allows the inclusion of a lightning suppression module secured to the inner face of the existing terminal lid.

Variation 3 - This variation introduced the following change:

- i. The use of an intumescent coating was allowed, this is applied to the exterior of the actuators for fire proofing purposes.

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Variation 4 - This variation introduced the following changes:

- i. The ambient temperature range associated with the IIC approval of the IQT range of actuators to be extended from -20°C to -50°C.
- ii. The introduction of an alternative external earth stud arrangement.
- iii. The introduction of an additional, alternative battery.

Variation 5 - This variation introduced the following changes

- i. The introduction of the deep terminal cover that allows the installation of an assortment of equipment within the terminal enclosure on Ex d versions, typically a PCB for Profibus applications, a contactor or a three-phase mains filter. To allow for the inclusion of additional circuitry, the deep cover is provided with threaded entry points to accommodate suitable, ATEX, Ex d cable entry devices that have been certified by a notified body..

Variation 6 - This variation introduced the following change:

- i. The use of an alternative window material and sealing cement, a special condition for safe use was introduced with this change and therefore an 'X' suffix has been added to the certificate number.

Variation 7 - This variation introduced the following change:

- i. addition of a Terminal Cover, Part No 48870, as an alternative component.

Variation 8 - This variation introduced the following change:

- i. The introduction of an alternative battery pocket plug; the alternative battery pocket plug material is Ryton ® R-4-200BL (f1), manufactured by Chevron Phillips Chemical Co LP.

Variation 9 - This variation introduced the following changes:

- i. The use of Chinese manufactured flamepath components (IQ and IQT all sizes) and enclosure castings (IQ sizes 1 to 3 only and IQT all sizes) was endorsed.
- ii. The use of Chinese manufactured motors (fitted with Chinese manufactured thermostats) IQ (sizes 1 to 3) was endorsed.
- iii. The use of an SLX Polycarbonate over- moulded window cove was allowed.
- iv. The drawing package was amended thereby clarifying previous modifications.

Variation 10 - This variation introduced the following changes:

- i. The introduction of a wireless network into the terminal enclosure and associated aerial.
- ii. The introduction of an alternative terminal bung material.

Variation 11 – This variation introduced the following changes:

- i. Following appropriate re-assessment to review the product design (Note: certain modifications that listed in Variations were omitted for commercial reasons) and to demonstrate compliance with the requirements of the latest series of standards, the documents originally listed in section 9, EN 50014:1997 (amendments A1 and A2), EN 50018:2000, EN 50019:2000, EN 50281-1-1:1998, EN 13463-1:2001 and prEN 13463-5:October 2003 were replaced by those currently listed and a new Description of Equipment that encompasses previous, relevant Variations was introduced. This re-assessment also included updating the markings in section 12, reviewing the certificate conditions and generating a new, definitive list of supporting documents that replaced all preceding versions.



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Variation 12 - This variation introduced the following change:

- i. To recognise the amendment to the routine testing requirements regarding the terminal covers.

Variation 13 - This variation introduced the following change:

- i. The introduction of the Part N° 46754, heat treated, gravity die cast terminal covers was recognised.

Variation 14 - This variation introduced the following change:

- i. The addition of LM25 Aluminium Alloy as a material option for the Motor Cover.

Variation 15 - This variation introduced the following change:

- i. The introduction of a vandal proof cover option for all actuator sizes.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	File/Report no.	Comment
0	3 October 2003	R53A8814A	The release of the prime certificate.
1	22 December 2004	R53A11394A	The introduction of Variation 1 (Note: For commercial reasons, this Variation was not included in the re-assessment done in Issue 13 but could be reinstated if required, therefore, the standards listed in section 9 do not cover this Variation).
2	6 January 2005	R53A7563Q	The introduction of Variation 2.
3	6 June 2005	R53A7563U	The introduction of Variation 3.
4	23 May 2006	R51A15000-001A	The introduction of Variation 4.
5	10 September 2007	R51A15000 006A	The introduction of Variation 5.
6	10 October 2007	R51A15000 004A	The introduction of Variation 6 (Note: as a result of this Variation, an 'X' suffix was added to the certificate number)
7	12 December 2007	R51A15000-018A	The introduction of Variation 7.
8	8 April 2008	R51A15000 008A	The introduction of Variation 8.
9	20 January 2009	R51A15000 019A	The introduction of Variation 9.
10	23 April 2009	R51A15000-030A	The introduction of Variation 10.
11	1 March 2010	R15000-005A/00	This Issue covers the following changes: • All previously issued certification was rationalised into a single certificate, Issue 11, Issues 0 to 10 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 11.
12	10 June 2010	R15000-036A/00	The introduction of Variation 12.
13	22 November 2010	R15000-045A/00	The introduction of Variation 13.
14	16 January 2013	R15000-063A/00	The introduction of Variation 14.
15	18 October 2013	R15000-068A/00	The introduction of Variation 15.

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15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)

15.1 When this equipment is fitted with a Makrolon® 6717 viewing window, it shall be positioned such that risk of impact to the window is low.

15.2 In accordance with clause 5.1 of EN 60079-1, the critical dimensions of the flamepaths are:

Flamepath	Flamepath Dimension	
	Gap (mm)	Length (mm)
Gearcase/Terminal Cover	0.15	26.70
Gearcase/Terminal Bung IIC	0.115	25.90
Gearcase/Electrical Cover	0.15	26.20
Gearcase/Motor Cover	0.15	25.60
Motor Shaft Shroud/Motor Shaft	0.24	25.00
Gearcase/Motor Shaft Shroud	Interference	25.00
Encoder Shaft Shroud/Encoder Shaft	0.24	25.20
Gearcase/Encoder Shaft Shroud	Interference	25.00

Threaded flamepaths	Thread Size	Thread Length (mm)
Battery Cover	M40 x 1.5p	10.00
Conduit Entry	M25 x 1.5p	20.50

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.

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 EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.

17.3 **Dielectric strength tests**

When the termination facility is to be designed as 'Ex e', the following electrical strength tests shall be applied to the termination facilities for at least 60 s and no more than 63 s as required by clause 6.1 of EN 60079-7:2007.

Test Voltage Applied Between	Test Voltage
Terminals with voltages of 90 V peak or greater and the case and lower voltage terminals	$1000 + 2U_{\text{RMS}}$ $^{+5}_{-0}$ % or $1500 V_{\text{RMS}}$ $^{+5}_{-0}$ % whichever is greater (U being the supply voltage)
Terminals with voltages not exceeding 90 V peak and the case	$500 V_{\text{RMS}}$ $^{+5}_{-0}$ %



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17.4 Routine overpressure tests

Each enclosure shall be subjected to a routine overpressure test in accordance with the tables below for the design option and ambient temperature range stated. In all cases the pressure shall be maintained for at least 10 s as required by clause 16 of EN 60079-1:2007. There shall be no permanent deformation or damage to the enclosure.

Long Cover Build IIC IQT-20°C to +70°C

Equipment	Test pressure	
	bar	lbf/in ²
Electrical Compartment (Gearcase)	19.08	276.67
Motor cover	19.08	276.67
Electrical cover (long) high pressure die cast	19.08	276.67
Electrical cover (long) gravity die cast	19.08	276.67
Window assembly	19.08	276.67
Terminal bung	19.08	276.67

17.5 Routine overpressure tests IQT 'Ex d' only fitted with a fibre optic coupler module -20°C to +70°C

Equipment	Test pressure	
	bar	lbf/in ²
Terminal Compartment (gearcase gravity diecast)	14.62	212.00
Deep Cover (Sand Cast)	14.62	212.00



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17.6 Routine overpressure tests IQT IIC (below -20°C to -50°C) to +70°C

Equipment		Test Pressure	
		bar	lbf/in ²
Terminal Compartment (Gearcase, All Sizes)		24.78	359.3
Terminal Cover (High Pressure die cast)		24.78	359.3
Electrical Compartment (Gearcase, All Sizes) Gravity Diecast & Gravity Diecast Heat Treated	short cover build DC version	40.29	584.2
	short cover build AC version	25.08	363.7
	long cover build DC version	38.07	552.0
	long cover build AC version	38.40	556.8
Motor Cover	short cover build DC version	40.29	584.2
	short cover build AC version	25.08	363.7
	long cover build DC version	38.07	552.0
	long cover build AC version	38.40	556.8
Electrical Cover (Short) High Pressure Die Cast	short cover build DC version	40.29	584.2
	short cover build AC version	25.08	363.7
Electrical Cover (Long) High Pressure Die Cast	long cover build DC version	38.07	552.0
	long cover build AC version	38.40	556.8
Electrical Cover (Long) Gravity Die Cast (Heat Treated)	long cover build DC version	38.07	552.0
	long cover build AC version	38.40	556.8
Window Assembly	short cover build DC version	40.29	584.2
	short cover build AC version	25.08	363.7
	long cover build DC version	38.07	552.0
	long cover build AC version	38.40	556.8
Terminal Bung	short cover build DC version	40.29	584.2
	short cover build AC version	25.08	363.7
	long cover build DC version	38.07	552.0
	long cover build AC version	38.40	556.8

17.7 Routine overpressure tests IQT 'Ex d' only fitted with deep terminal cover (-20°C to +70°C)

Equipment	Test pressure	
	bar	lbf/in ²
Deep terminal cover - sand cast	13.54	196.33

17.8 Routine overpressure tests IQT 'Ex d' only fitted with deep terminal cover (below -20°C to -50°C) to +70°C

Equipment	Test pressure	
	bar	lbf/in ²
Deep terminal cover - sand cast	20.87	302.62
Terminal compartment (Gearcase, All Sizes)	20.87	302.62
Terminal bung	20.87	302.62

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- 17.9 **Routine overpressure tests IQT fitted with Makrolon® window and Loctite® 5699
-20°C to +70°C**

Equipment	Test pressure	
	bar	lbf/in ²
Long cover	19.08	277

- 17.10 **Routine overpressure tests IQT fitted with Makrolon® window and Loctite® 5699
(below -20°C to -50°C to +70°C)**

Equipment	Test pressure	
	bar	lbf/in ²
Long cover	38.40	557
Short cover	40.29	585

- 17.11 The manufacturer shall take all reasonable steps to ensure that the user/installer complies with the Special Conditions for Safe Use and if the viewing window is made from Makrolon® 6717, this shall be clearly define.

Certificate Annexe

Certificate Number: Sira 03ATEX1255X
Equipment: IQT Range of Electric Valve Actuators
Applicant: Rotork Controls Ltd
Rotork Controls Inc.



Issue 0 to 10 (The drawings listed with these Issues were rationalised and have been superseded by those detailed in Issue 11.)

Issue 11

Drawing	Sheets	Rev.	Date	Title
PLAD 1216	1 to 6	06	14 Jan 10	Parts List For IQT125, IQT250 and IQT500 Actuators ATEX Approval Group IIC
AD1216	1 to 4	04	08 Jan 10	IQT125, IQT250 & IQT500 Actuators – ATEX Approval Group IIC
PLAD1217	1 to 6	06	14 Jan 10	Parts List For IQT1000 and IQT2000 Actuators ATEX Approval Group IIC
AD1217	1 to 4	04	08 Jan 10	IQT1000 & IQT2000 Actuators – ATEX Approval Group IIC
AD1256	1 of 1	02	14 Dec 06	IQT 125 – 500 ATEX & IECEx Intumescent® Coating Certification Drawing
AD1257	1 of 1	02	01 Feb 10	IQT 1000 – 2000 ATEX & IECEx with Intumescent® Coating Certification Drawing
AD1260	1 of 1	01	04 Oct 04	IQ/IQT Fibre Optic & Lightning Suppression Modules For ATEX Approval Group IIB and IIC
AD1297	1 to 2	04	01 Feb 10	Deep Cover Housing For IQ And IQT Actuator Ranges ATEX & IECEx Group IIB And IIC

Issue 12

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
AD1260	1	2	21 May 10	IQ/IQT Fiber Optic & Lightning Suppression Modules for ATEX Approval Groups IIB and IIC.

Issue 13

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
PLAD 1216	1 to 6	07	26 Oct 10	Parts list for IQT125, IQT250 & IQT500 Actuators ATEX Approval Group IIC
PLAD 1217	1 to 6	07	26 Oct 10	Parts list for IQT1000 & IQT2000 Actuators ATEX Approval Group IIC

Issue 14

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
PLAD1216	1 to 6	8	04 Jan 13	Parts list for IQT125, IQT250 and IQT500 Actuators ATEX approval Group IIC
PLAD1217	1 to 6	8	04 Jan 13	Parts list for IQT1000 and IQT2000 Actuators ATEX approval Group IIC

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Drawing	Sheets	Rev	Date (Sira stamp)	Title
AD1425	1 to 2	1	09 Oct 13	Vandal Proof Cover IQ2 & IQT All Sizes, ATEX,& IECEx IIB & IIC

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