



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 04.0004X** issue No.:8

Status: **Current**

Date of Issue: **2013-10-11** Page 1 of 5

Applicant: **Rotork Controls Ltd**
Brassmill Lane
Bath BA1 3JQ
England
United Kingdom

Certificate history:
Issue No. 8 (2013-10-11)
Issue No. 7 (2011-6-10)
Issue No. 6 (2011-3-23)
Issue No. 5 (2011-1-20)
Issue No. 4 (2010-11-22)
Issue No. 3 (2008-11-5)
Issue No. 2 (2008-1-17)
Issue No. 1 (2006-2-16)

Electrical Apparatus: **IQ Range of Electrical Actuators**
Optional accessory:

Type of Protection: **Flameproof or Flameproof and Increased Safety**

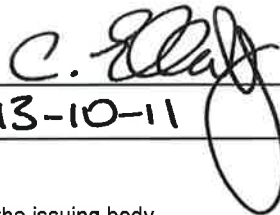
Marking: **Ex de* IIC T4**
Ta =-20°C to +70°C**
* If increased safety terminal facility is used
** May be down to -50°C

Approved for issue on behalf of the IECEx Certification Body: C Ellaby

Position: Deputy Certification Manager

Signature:
(for printed version)

Date:


2013-10-11

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
Rake Lane
Eccleston
Chester
CH4 9JN
United Kingdom

sira
CERTIFICATION



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Manufacturer: **Rotork Controls Ltd**
Brassmill Lane
Bath BA1 3JQ
England
United Kingdom

Additional Manufacturing location
(s):

Rotork Controls Inc
675 Mile Crossing Blvd,
Rochester, NY 14624
United States of America

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 : 2004 Edition: 4.0	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
IEC 60079-1 : 2003 Edition: 5	Electrical apparatus for explosive gas atmospheres - Part 1: Flameproof enclosure 'd'
IEC 60079-7 : 2001 Edition: 3	Electrical apparatus for explosive gas atmospheres - Part 7: Increased safety 'e'

*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

IECEx ATR:	File Reference:
Refer to previous issues for ExTR's and QAR's	GB/SIR/ExTR11.0139/00
GB/SIR/QAR07.0003/01 and GB/SIR/QAR06.0023/02	GB/SIR/ExTR13.0286/00
GB/SIR/ExTR11.0067/00	



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Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The IQ Range Electric Valve Actuators are a series of electro-mechanical valve actuators that utilise cast aluminium/cast iron flameproof enclosures. They are rated 3 phase, up to 690 V rms and single phase up to 240 V rms.

The Actuators are described in full in the Annexe to this certificate.

See Annexe for Conditions of Manufacture.

CONDITIONS OF CERTIFICATION: YES as shown below:

See Additional page for Conditions of Certification.



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

Issue No.: 1 Dated 2006-02-16	
1	The introduction of an alternative external earth stud arrangement – All Actuator sizes.
2	The introduction of an additional alternative battery – All Actuator sizes.
3	The introduction of an alternative high-pressure die cast motor cover – Actuator Sizes 1 and 2 only (Brook and AEG Motors).
4	The introduction of AEG motors and associated alternative motor covers – All Actuator sizes.
5	The introduction of the IQH variant – Actuator Size 2, Size 3 and Size 5 (IQ40). Ambient Temperature Range of -20°C to +60°C.
6	The introduction of an alternative motor cover Actuator Size 3 W90 Brook motors.
7	The extension of the ambient temperature range of the IQ Actuators from -20°C to -50°C.
Issue No.: 2 Dated 2008-01-07	
1	The introduction of an alternative terminal cover
2	The introduction of an alternative window material (Makrolon ® 6717 sealed in place with Loctite ® 5699)
Issue 3 - this Issue introduced the following change:	
1	The introduction of the deep terminal cover.
Issue 4 - this Issue introduced the following change:	
1	The introduction of the Part N° 46754 heat treated, gravity die cast terminal covers was recognised.
Issue 5 - this Issue introduced the following change:	
1	The ambient temperature range was approved to be increased from +60°C to +70°C.
Issue 6 - this Issue introduced the following changes:	
1	The introduction of the alternative manufacturing address in Rochester NY 14624 was recognised.
2	The introduction of the absolute encoder driveshaft, IQ sizes 1 to 3 was approved.
Issue 7 - this Issue introduced the following change:	
1	The introduction of a non metallic battery pocket plug material was approved.
Issue 8 - this Issue introduced the following changes:	
1.	The introduction of a vandal proof cover option for all actuator sizes.



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Additional information:

Conditions of Certification

1 The maximum constructional gap (l_c) is less than that required by Table 2 of IEC 60079-1:2003 as detailed below:

IQ MAXIMUM FLAMEPATH GAPS (GAS GROUP IIC)

Flamepath

	Max. Gap (mm)
Motor Cover/ Gearcase	0.12
Wormshaft Shroud/ Gearcase	0.05
Wormshaft Shroud/ Gearcase	-0.04/0.00
Wormshaft/ Wormshaft Shroud	0.24
Wormshaft/ Wormshaft Shroud	0.22
Terminal Bung/ Gearcase	0.115
Resolver Shaft/ Resolver Shaft Bush	0.10
Resolver Shaft Bush/ Gearcase	-0.05/0.00
Stator Locking Pin/ Motor Cover	-0.05/-0.20

Actuator Type and Size

IQH20 and IQH25
IQ10, IQ12, IQ18, IQ20, IQ25, IQ35 IQM10, IQM12, IQM20, IQM25 IQS12, IQS20, IQS35 IQH20, IQH25, IQH35
IQ40, IQ70, IQ90, IQ91, IQH40
IQ10, IQ12, IQ18, IQ20, IQ25, IQ35 IQM10, IQM12, IQM20, IQM25 IQS12, IQS20, IQS35 IQH20, IQH25, IQH35
IQ40, IQ70, IQ90, IQ91, IQH40
All Types and Sizes
All Types and Sizes
All Types and Sizes
IQ10, IQ12, IQ18, IQ20, IQ25, IQ35 IQM10, IQM12, IQM20, IQM25 IQS12, IQS20, IQS35 IQH20, IQH25, IQH35

Note: Negative sign, denotes an interference fit.

2 This equipment must only be located where the risk of impact upon the viewing window is low

Annexe to: IECEx SIR 04.0004X Issue 8
Applicant: Rotork Controls Ltd.
Apparatus: IQ Range of Electric Valve Actuators



The IQ Electric Actuator comprises of an oil filled worm gearcase with handwheel and de-clutch mechanism to which is attached a motor enclosure, an electrical control enclosure and a terminal enclosure. All enclosures are designed to satisfy the requirements for flameproof equipment. In addition the terminal enclosure is designed to satisfy the requirements for increased safety, providing an alternative method of protection for the field wiring facilities. The IQ electric actuator comprises of a range of electric actuators based upon four gearcase sizes.

The motor cover connects to the gearcase by means of a spigoted flamepath joint and is secured by four M8 capscrews. The rotary output from the motor, transfers to the gearcase by means of a shaft supported by rolling element bearings and a cylindrical brass bushing forms its flamepath. Electrical services to the motor are supplied from the electrical enclosure via a potted, motor loom transfer bush.

Thermal protection devices are installed within the motor windings. There is a facility to override these devices should the user find it necessary. The scope of this assessment does not consider the equipment when the thermal devices have been overridden.

The electrical cover connects to the gearcase by means of a spigoted flamepath joint and is secured by four M8 capscrews. The electrical enclosure contains monitoring and control circuitry, which senses and controls the position of the output shaft; it also contains a type PP3 battery backup. At one end of the electrical enclosure a window is provided to allow the external observation of an internal LCD device. The window is manufactured from glass and potted into the electrical cover. An encoder shaft exits the electrical enclosure via a press fit cylindrical brass bushing, flamepaths being between the bush and the gearcase and between the shaft and the bush. The encoder shaft is held in place by means of a gear and circlip at one end and a magnet and a circlip at the other.

The terminal enclosure connects to the electrical enclosure via the gearcase, their volumes being separated by a terminal bung. The terminal bung comprises of moulded plastic main body through which passes a number of terminals which are sealed in place with a potting compound. The terminal bung is secured in position by means of a circlip. The terminal enclosure provides all electrical field-wiring terminations at the terminal bung. Cable entry facilities are provided in the form of three or four threaded entries. The terminal enclosure is closed by means of a lid, which connects to the gearcase by means of a tapered spigot joint and is secured by four M8 capscrews.

The terminal compartment is common to all sizes. The following gearcase/motor options are covered by the scope of this report:

IQ Gearcase/ Motor Configurations 3 phase, up to 690 V rms

Actuator Size	IQ Gearcase/Motor Combinations
Size 1	Gearcase size 1 One motor enclosure, four pole motors, two stator lengths Designated IQ 10, 12, 18
Size 2	One motor enclosure, with either two or four pole motors, six stator lengths Designated IQ 20, 25
Size 3	Gearcase Size 3 One motor enclosure, with either two or four pole motors, one stator length Designated IQ 35
Size 5	Gearcase size 5 Motor Options Three Motor enclosures: One motor enclosure with either two or four pole motor, one stator length Designated IQ40 One motor enclosure with either two or four pole motors, five stator lengths Designated IQ 70, 90, 95 One motor enclosure with a two pole motor, one stator length Designated IQ 91

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DESIGN OPTIONS

Single Phase Motor Options for Sizes 1, 2 and 3

IQ S12 4 pole 110 to 240 Vrms \pm 10%
IQ S20 4 pole 110 to 240 Vrms \pm 10%
IQ S35 2/4 pole 110 to 240 Vrms \pm 10%

Different motor options (as can be seen above) as well as the necessary alternative control equipment within the electrical enclosure.

Modulating Motor Control for Three Phase Motors, Sizes 1, 2 and 3

IQM10 IQM12
IQM20 IQM25
IQM35

The reversing contactor is replaced with a solid state starter module, utilising thyristor drives and their associated control electronics.

Smith Flow Control Interlock

The installation of an interlocking device to the exterior of the electrical cover. It can be applied to all sizes.

Intumescent®, Coating to the Exterior of the Actuators for Fire Proofing Purposes

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

Short Electrical Covers as an Option on Gearcase Sizes 1, 2 and 3

The shorter electrical cover is intended for fitting where the internal equipment specified for the IQ Electric Valve Actuator allows a reduced size electrical enclosure.

IQH Variant – Actuator Size 2, Size 3 and Size 5. Ambient Temperature Range -20°C to $+70^{\circ}\text{C}$

The IQH variant introduces a gearing mechanism between the motor and the output shaft. The IQH versions include:

Size 2: IQH20, IQH25
Size 3: IQH35
Size 5: IQH40

Annexe to: IECEx SIR 04.0004X Issue 8
Applicant: Rotork Controls Ltd.
Apparatus: IQ Range of Electric Valve Actuators



Specific Flamepath Gaps IQ Maximum Flamepath Gaps (Gas Group IIB) – Refer to Conditions of Certification

Flamepath	Max. Gap (mm)	Actuator Type and Size
Motor Cover / Gearcase	0.12	IQH20 and IQH25
Wormshaft Shroud / Gearcase	0.05	IQ10, IQ12, IQ18, IQ20, IQ25, IQ35 IQM10, IQM12, IQM20, IQM25 IQS12, IQS20, IQS35 IQH20, IQH25, IQH35
Wormshaft Shroud / Gearcase	-0.04/0.00	IQ40, IQ70, IQ90, IQ91, IQH40
Wormshaft / Wormshaft Shroud	0.24	IQ10, IQ12, IQ18, IQ20, IQ25, IQ35, IQM10, IQM12, IQM20, IQM25 IQS12, IQS20, IQS35 IQH20, IQH25, IQH35
Wormshaft / Wormshaft Shroud	0.22	IQ40, IQ70, IQ90, IQ91, IQH40
Terminal Bung / Gearcase	0.115	All Types and Sizes
Resolver Shaft / Resolver Shaft Bush	0.10	All Types and Sizes
Resolver Shaft Bush / Gearcase	-0.05/0.00	All Types and Sizes
Stator Locking Pin / Motor Cover	-0.05/-0.20	IQ10, IQ12, IQ18, IQ20, IQ25, IQ35 IQM10, IQM12, IQM20, IQM25 IQS12, IQS20, IQS35 IQH20, IQH25, IQH35

Note: Negative sign, denotes an interference fit.

Required routine hydrostatic testing (-20°C to +70°C)

Each enclosure shall be subjected to a routine overpressure test in accordance with the table below. In all cases the pressure shall be maintained for at least 10 s as required by clause 16 of IEC 60079-1:2003. There shall be no permanent deformation or damage to the enclosure.

Equipment	Overpressure Test Pressure	
	Bar	Lbf/in ²
Deep terminal cover - sand cast	13.54	196.33

Required routine hydrostatic testing (below -20°C to -50°C to +70°C)

Each enclosure shall be subjected to a routine overpressure test in accordance with the table below. In all cases the pressure shall be maintained for at least 10 s as required by clause 16 of IEC 60079-1:2003. There shall be no permanent deformation or damage to the enclosure.

Equipment	Overpressure 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