



IECEX Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres

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

Certificate No.: **IECEX CML 20.0050X** Page 1 of 3 [Certificate history:](#)

Status: **Current** Issue No: 0

Date of Issue: 2020-06-01

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

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

Optional accessory:

Type of Protection: **Flameproof "db", Increased Safety "eb", Dust Ignition "tb", Non-Electrical "h"**

Marking: Ex db h IIB T4 Gb
Ex h tb IIIC T120°C Db
IP66/IP68
OR (when Ex e terminal facility is required)
Ex db eb h IIB T4 Gb
Ex h tb IIIC T120°C Db
IP66/IP68
T_a marking options:
-20°C to +70°C
-30°C to +70°C
-40°C to +70°C
-50°C to +40°C

Approved for issue on behalf of the IECEx
Certification Body:

R C Marshall

Position:

Certification Officer

Signature:
(for printed version)

Date:

2020-06-01

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Eurofins E&E CML Limited
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United Kingdom





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Date of issue: 2020-06-01 Issue No: 0

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

Additional manufacturing locations:

Rotork Actuation (Shanghai) Co., Ltd. Building G No.260 Liancao Rd Minhang District Shanghai 201108 China	Rotork Controls, Inc. 675 Mile Crossing Blvd Rochester NY 14624 United States of America
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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 equipment 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 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

IEC 60079-1:2014-06 Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
Edition:7.0

IEC 60079-31:2013 Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"
Edition:2

IEC 60079-7:2017 Explosive atmospheres - Part 7: Equipment protection by increased safety "e"
Edition:5.1

ISO 80079-36:2016 Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic methods and requirements
Edition:1.0

This Certificate **does not** indicate compliance with 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/CML/ExTR20.0061/00](#)

Quality Assessment Reports:

[GB/CML/QAR19.0012/00](#)

[GB/CML/QAR19.0019/00](#)

[GB/CML/QAR20.0010/00](#)



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Date of issue: 2020-06-01

Issue No: 0

EQUIPMENT:

Equipment and systems covered by this Certificate are as follows:

The IQ Range of Electric Valve Actuators comprise of an oil-filled worm gearcase with a rotating shaft and drive bush, an external handwheel and de-clutch mechanism. Attached to the gearcase is a motor enclosure, an electrical control enclosure and a terminal enclosure. All electrical enclosures are designed to satisfy the requirements for flameproof equipment.

Refer to Annex for full description and conditions of manufacture.

SPECIFIC CONDITIONS OF USE: YES as shown below:

Refer to Annex for specific conditions of use.

Annex:

[IECEX CML 20.0050X Iss. 0 Certificate Annex.pdf](#)

Annexe to: IECEx CML 20.0050X
Applicant: Rotork Controls Limited
Apparatus: IQ Range of Electric Valve Actuators



Description

The IQ Range of Electric Valve Actuators comprise of an oil-filled worm gearcase with a rotating shaft and drive bush, an external handwheel and de-clutch mechanism. Attached to the gearcase is a motor enclosure, an electrical control enclosure and a terminal enclosure. All electrical 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 Range of Electric Actuators comprise of a range of electric actuators based upon various gearcase sizes.

The motor enclosure is formed by a cover which connects to the gearcase by means of a spigoted flamepath joint and is secured by four M8 socket cap-head screws. 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 forming 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.

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

The electrical enclosure is formed by a cover which connects to the gearcase by means of a spigoted flamepath joint and is secured by four M8 socket cap-head screws. The electrical enclosure contains monitoring and control circuitry, which senses and controls the position of the output shaft; it also contains a back-up battery facility, contained within an internal battery pocket, accessed externally via the battery pocket plug. The permitted battery types are: Ultralife PP3 type U9VL/U9VL-J-P; SAFT to Rotork part no. 95-462; Tadiran/Sonnenschein to Rotork part no. 95-614, in each case the battery is protected by an in-line fuse (permitted fuse types are Quick Blow Bussman S500, 100 mA, Quick Blow Littlefuse 217, 100 mA).

At one end of the electrical enclosure a window is provided to allow the observation of an internal LCD device. The window is manufactured from toughened glass and potted into the electrical cover. An encoder shaft exits the electrical enclosure via a cylindrical brass bushing, flamepaths being between the bushing and the gearcase and between the shaft and the bushing. The encoder shaft has a shoulder that is held against the shroud by a circlip.

The terminal enclosure connects to the electrical enclosure via the gearcase, their volumes being separated by a flameproof terminal bung. The flameproof terminal bung comprises of a 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. The above flameproof terminal bung may be replaced with a non-flameproof terminal bung, in which case the electrical and terminal compartments are considered as one flameproof enclosure. This configuration cannot be applied to the variants that incorporate increased safety terminal facilities. Cable entry facilities are provided in the form of three or four threaded entries. The terminal enclosure is closed by

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means of a lid, which connects to the gearcase by means of a tapered spigot joint and is secured by four M8 socket cap-head screws. The terminal compartment is common to all sizes.

All external fasteners are stainless steel either, grade A4-80 or grade 12.9 socket cap head screws.

Model Codes

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

Size 1

Gearcase size 1

One motor enclosure, four pole motors, two stator lengths Designated IQ10, 12 & 18.

Size 2

Gearcase size 2

One motor enclosure, with either two or four pole motors, six stator lengths Designated IQ19, 20 & 25.

Size 3

Gearcase size 3

One motor enclosure, with either two or four pole motors, one stator length Designated IQ35.

Size 5

Gearcase size 5

Motor Options

Three Motor enclosures:

One motor enclosure with two or four pole motor, one stator length

Designated IQ40

One motor enclosure with either two or four pole motors, five stator lengths Designated IQ70, IQ90, or IQ95.

One motor enclosure with a two pole motor, one stator length

Designated IQ91

Design Options

Single phase motor option – Actuator sizes 1, 2 and 3

Actuator	Motor type
IQS12	4 pole 110 Vrms to 240 Vrms \pm 10%
IQS20	4 pole 110 Vrms to 240 Vrms \pm 10%
IQS35	2/4 pole 110 Vrms 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 option for three phase motors – Actuator sizes 1, 2 & 3

The reversing contactor has been replaced with a solid-state starter module, utilising thyristor drives and their associated control electronics, designated:
IQM10, IQM12, IQM20, IQM25, IQM35

Deep Terminal Cover Option – All Actuator sizes

The deep terminal cover allows the installation of a PCB for various network disconnect applications or a wireless network PCB and associated external aerial enclosure, on Ex db versions. The deep cover is provided with threaded entry points.

Short electrical cover option – Actuator sizes 1, 2 & 3

Used when the internal equipment specified for the IQ Electric Valve Actuator allows a reduced size of electrical enclosure.

DC Motor options for Actuator sizes 1 & 2

Ambient temperature range -20°C to +70°C (Leeson motor)

Actuator	Motor type
IQD10, IQD12 & IQD18	Short Motor (Leeson motor)
IQD20	Short Motor (Leeson motor)
IQD25	Long Motor (Leeson motor)

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

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.

Lightning suppression module option – All Actuator sizes

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

IQH variant option – Ambient temperature range -20°C to +70°C

The following high-speed actuator types have been introduced:
IQH20, IQH25, IQH35, IQH40

Plug and Socket Cover/ Plug and Socket connection/ Non-Flameproof Terminal Bung option - Ex db versions gas group IIB only, all sizes, ambient temperature range -20°C to +70°C

The flameproof terminal bung is removed and replaced with a non-flameproof plug and socket arrangement, to accommodate the plug and socket arrangement a Plug and Socket Cover has been introduced, manufactured in aluminium alloy to BS 1490 LM25M. The latter includes up to four



M25 threaded cable entry points, additionally it can optionally accommodate the Network Disconnect PCB.

Optionally in place of the plug and socket connection facility, a non-flameproof terminal bung can be installed along with the Plug and Socket Cover, with or without the Network Disconnect PCB.

Design Options

- i. Alternative absolute encoder shaft, manufactured in steel (Sizes 1, 2 and 3).
- ii. Alternative electrical cover manufactured in aluminium alloy to BS1490. Grade: LM25TF (heat treated).
- iii. Alternative design for the handwheel cover seal for all sizes.
- iv. Alternative Size 2 motor cover (Brook Motor).
- v. Alternative electrical cover manufactured in aluminium alloy to ASTM B85, Grade: A360 modified to accept an anti-vandal fixture.
- vi. Alternative Plug and Socket Cover/Plug and Socket connection/Non-Flameproof Terminal Bung option:
 - Ex db versions only; all sizes; ambient temperature range -20°C to +70°C;
 - Ex tb versions only; all sizes; ambient temperature range -50°C to +70°C.

Conditions of Manufacture

The following conditions are required of the manufacturing process for compliance with the certification.

- i. Where the product incorporates certified parts or safety critical components the manufacturer shall ensure that any changes to those parts or components do not affect the compliance of the certified product that is the subject of this certificate.
- ii. Each enclosure shall be subjected to a routine overpressure test in accordance with IEC 60079-1 clause 16 at the following values.

Equipment	
Motor Enclosure	Test Pressure (bar)
Size 5	
Gearcase/Motor Compartment IQ70/90/95 - Aluminium Alloy to BS 1490, Grade: LM25M (or equivalent)	13.88
IQ70/90*/95 Motor Cover - Aluminium Alloy to BS 1490, Grade: LM25M (or equivalent)	13.88
<i>cont.</i>	

Routine overpressure tests IQ Tamb below -20°C

Equipment	
All sizes with Deep Terminal Cover fitted	Test Pressure (bar)
Certified Terminal Bung - Crastin ST830FRUV/Robnor PX700/BK	16.56
Gearcase - Flameproof Terminal Bung fitted	
Size 1	
Gearcase/Electrical Compartment - Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	16.92
Terminal Bung - Crastin ST830FRUV/Robnor PX700/BK	16.92
Size 2	
Gearcase/Electrical Compartment - Aluminium Alloy to BS149, Grade: LM25M (or equivalent)	22.85
Terminal Bung - Crastin ST830FRUV/Robnor PX700/BK	22.85
Long Electrical Cover - Aluminium Alloy to ASTM B85, Grade: A360 (or equivalent)	22.85
Motor Loom Bush - Robnor PX700/BK	22.85
Short Electrical Cover aluminium alloy to ASTM B85, Grade: A360 (or equivalent)	22.85
Size 3	
Gearcase/Electrical Compartment - Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	17.27
Terminal Bung - Crastin ST830FRUV/Robnor PX700/BK	17.27
Size 5	
Terminal Bung - Crastin ST830FRUV/Robnor PX700/BK (tested from either terminal or flameproof side)	17.27
Gearcase – Flameproof Terminal Bung not fitted	
Size 2	
Gearcase/Electrical-Terminal Comp Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	23.30
Long Electrical Cover - Aluminium Alloy to ASTM B85, Grade: A360 (or equivalent)	23.30
Long Electrical Cover - Aluminium Alloy to BS1490, Grade: LM25TF (Heat Treated) (or equivalent)	23.30
Motor Loom Bush - Robnor PX700/BK	23.30
Short Electrical Cover - Aluminium Alloy to ASTM B85, Grade: A360 (or equivalent)	23.30
Size 3	
Gearcase/Electrical-Terminal Comp - Aluminium Alloy to BS149, Grade: LM25M (or equivalent)	19.31
Motor loom bush - Robnor PX700/BK	19.31
Short Electrical Cover - Aluminium Alloy to ASTM B85, Grade: A360 (or equivalent)	19.31
Size 5	

Gearcase/Electrical-Terminal Compartment - Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	33.90
Terminal Cover - Aluminium Alloy to ASTM B85, Grade: A360 (or equivalent)	33.90
Long Electrical Cover - Aluminium Alloy to ASTM B85, Grade: A360 (or equivalent)	33.90
Long Electrical Cover - Aluminium Alloy to BS1490, Grade: LM25TF (Heat Treated) (or equivalent)	33.90
Motor Loom Bush - Robnor PX700/BK (Size 5)	33.90
Motor Enclosure	
Size 5	
Gearcase/Motor Compartment IQ40 - Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	18.27
Gearcase/Motor Compartment IQ70/90/95 - Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	18.27
Motor Loom Bush (IQ70/90/95 motor side, when terminal bung fitted) - Robnor PX700/BK (Size 5)	18.27
Gearcase/Motor Compartment IQ91 - Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	18.27
IQ40 Motor Cover - Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	18.27
IQ70/90/95 Motor Cover - Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	18.27

When fitted with the Plug & Socket connection facility and associated Plug and Socket Cover. Routine overpressure tests Tamb -20°C

Equipment	
Without Network PCB fitted	Test Pressure (bar)
SIZE 2 Gearcase/Electrical-Terminal Compartment (with A4-80 grade fasteners) - Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	17.91
SIZE 3 Gearcase/Electrical-Terminal Compartment (with A4-80 grade fasteners) - Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	17.91
With Network PCB fitted	
Motor Loom Bush (Sizes 1-3) - Robnor PX700/BK	20.54
Motor Loom Bush (Size 5) - Robnor PX700/BK	20.54
Short Electrical Cover - Aluminium Alloy to ASTM B85, Grade: A360 (or equivalent)	20.54
SIZE 1 Gearcase/Electrical-Terminal Compartment (with A4-80 grade fasteners) - Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	20.54
SIZE 2 Gearcase/Electrical-Terminal Compartment (with A4-80 grade fasteners) - Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	20.54
SIZE 2 Gearcase/Electrical-Terminal Compartment (with grade 12.9 fasteners) - Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	20.54

SIZE 3 Gearcase/Electrical-Terminal Compartment (with A4-80 grade fasteners) - Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	20.54
SIZE 5 Gearcase/Electrical-Terminal Compartment (with A4-80 grade fasteners) - Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	20.54

Routine overpressure tests when fitted with Plug & Socket Cover; Non-flameproof Terminal Bung. Tamb -20°C

Equipment	
With Network PCB fitted	Test Pressure (bar)
SIZE 2 Gearcase/Electrical-Terminal Compartment (with A4-80 grade fasteners) - Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	17.17
SIZE 3 Gearcase/Electrical-Terminal Compartment (with A4-80 grade fasteners) Aluminium Alloy to BS1490, Grade: LM25M (or equivalent)	17.17

- iii. When the terminal enclosure utilises increased safety explosion protection, the following electrical strength tests shall be applied to the termination facilities for at least 60 in accordance with IEC 60079-7 clause 6.1 at the following values.

Test Voltage Applied Between	Test Voltage
Three phase terminals/case	2,500 Vrms
Three phase terminals/low voltage terminations	2,500 Vrms
Low voltage terminals/case	1,500 Vrms

Alternatively, a test shall be carried out at 1.2 times the test voltage but maintained for at least 100 ms in accordance with IEC 60079-7 clause 7.1.

Specific Conditions of Use

- i. The IQ Range of Electric Valve Actuators shall be installed such that the risk of impact to the window is low.
- ii. In accordance with IEC 60079-1 clause 5.1, the critical dimensions of the flamepaths are as follows.

Flamepath	IQ Sizes 1, 2 & 3		IQ Size 5	
	Max. Gap (mm)	Min. L (mm)	Max. Gap (mm)	Min. L (mm)
Gearcase / Motor Cover	0.15	25.0	0.15	25.00
Gearcase / Wormshaft shroud	0.05	35.0	0.00	49.75
Wormshaft shroud / Wormshaft	0.24	26.0	0.25	49.75
Gearcase / Terminal Bung	0.20	27.0	0.20	27.00
Gearcase / Terminal Cover	0.15	27.0	0.15	27.00
Gearcase/Plug and Socket Cover	0.15	27.00	0.15	27.00
Gearcase / Electrical Cover	0.15	26.0	0.15	26.00
Encoder Shaft Bush / Encoder Shaft	0.08	27.0	0.08	27.00
Gearcase / Encoder Shaft Bush	0.07	25.0	0.07	25.00
Gearcase / Motor Loom Bush	0.15	29.0	0.15	33.25
Gearcase / Deep Terminal Cover	0.15	27.0	0.15	27.0
Gearcase / Short Electrical Cover	0.15	26.0	-	-

- iii. **WARNING** – There is a potential electrical charging hazard associated with the non-metallic external parts and outer case depending on the model and coating applied; see user instructions.