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 SIR 11.0041X**

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Certificate history:

Status: **Current**

Issue No: 7

Issue 6 (2021-10-01)
Issue 5 (2018-10-25)
Issue 4 (2016-10-13)
Issue 3 (2016-07-25)
Issue 2 (2014-09-25)
Issue 1 (2014-07-07)
Issue 0 (2011-06-02)

Date of Issue: 2022-10-10

Applicant: **Rotork UK Ltd.**
9 Brown Lane West
Holbeck
Leeds LS12 6BH
United Kingdom

Equipment: **SI-2.1 and SB-2 Electro - Hydraulic Power Units**

Optional accessory:

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

Marking: **SI-2.1 Electro- Hydraulic Power Unit**
Ex db eb[1] IIB T4 Gb Ta -40°C to +65°C
Ex db eb[1] IIB T4 Gb Ta -50°C to +65°C (Single phase supply voltage only)
Ex db eb[1] IIC T4 Gb Ta -20°C to +65°C
SB-2 Electro- Hydraulic Power Unit
Ex db eb[1] IIB T4 Gb Ta -40°C to +60°C
([1] "eb" added on versions with increased safety terminal enclosure option, for single Ø and DC versions only)

Approved for issue on behalf of the IECEx Certification Body: **Michelle Halliwell**

Position: **Director Operations, UK & Industrial Europe**

Signature:
(for printed version)

Date:
(for printed version)

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 www.iecex.com or use of this QR Code.

Certificate issued by:

CSA Group Testing UK Ltd
Unit 6, Hawarden Industrial Park
Hawarden, Deeside CH5 3US
United Kingdom

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Manufacturer: **Rotork UK Ltd.**
9 Brown Lane West
Holbeck
Leeds LS12 6BH
United Kingdom

Manufacturing locations: **Rotork UK Ltd.**
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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 60079-7:2017 Explosive atmospheres - Part 7: Equipment protection by increased safety "e"
Edition:5.1

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 Reports:

GB/CSAE/ExTR21.0104/00
GB/SIR/ExTR11.0120/00
GB/SIR/ExTR14.0146/00
GB/SIR/ExTR14.0224/00
GB/SIR/ExTR16.0190/00
GB/SIR/ExTR16.0269/00
GB/SIR/ExTR18.0190/00

Quality Assessment Report:

GB/CSAE/QAR22.0009/00

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EQUIPMENT:
Equipment and systems covered by this Certificate are as follows:

The Electro - Hydraulic Power Unit, is a self-contained electrically operated source of hydraulic power, which can be instantaneously switched to increase or decrease the pressure to a suitable spring return/ double acting, linear or quarter-turn actuator. The power unit consists of four distinct enclosures, which are separated by the centre housing casting.
Refer to Annexe for the continuation of Equipment description and part number structure.

SPECIFIC CONDITIONS OF USE: YES as shown below:
Refer to Annexe.

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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)
This issue, Issue 7, recognises the following changes; refer to the certificate annex to view a comprehensive history:

1. The QAR reference has now been changed from GB/SIR/QAR07.0033/08 to GB/CSAE/QAR22.0009/00, no ExTR was raised.

Annex:

IECEx SIR 11.0041X Issue 7 Annexe.pdf

The Electro - Hydraulic Power Unit, is a self-contained electrically operated source of hydraulic power, which can be instantaneously switched to increase or decrease the pressure to a suitable spring return/ double acting, linear or quarter-turn actuator. The power unit consists of four distinct enclosures, which are separated by the centre housing casting.

The electrical enclosure, which has been designed to meet the requirements of 'Ex d' type of protection, can contain the following equipment;

SI-2.1 -a display window, control PCB, power PCB, transformer and pressure transducer.
SB-2 -a control PCB, with transformer and a pressure switch.

The terminal enclosure contains the electrical connections for external use. The power supply for 3-phase units is housed in an extended version of the terminal cover. The enclosure, when fitted with the short terminal cover, has been designed to meet the requirements of 'Ex d' type of protection. The electrical connections have been designed to meet the requirements of 'Ex e' type of protection.

The motor enclosure contains an electric motor and up to three solenoid valves. Connection between the electrical enclosure and the motor enclosure is made with a component certified threaded bush. to IECEx PTB 06.0093U. or IECEx EPS13.0045U

The oil reservoir contains a pump, pressure relief valve and a check valve.

The power supply of the unit can either be:

SI-2.1
24 Vdc (±10%)
115 / 230 Vac, 50 / 60 Hz single-phase (±10%)
380-480 Vac, 50 / 60 Hz 3-phase (±10%)

SB-2
115 / 230 Vac, 50 / 60 Hz single-phase (±10%)

The enclosure is made from cast aluminium alloy.

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SI-2.1 Part Number Structure

SI-2.1-abcde

a	b	c	d	e
0 FAIL-SAFE	0 STANDARD INTERNAL S.V.	0 SINGLE-PHASE 110-120 Vac 50/60 Hz	0 DIGITAL CONTROL	0
1 FAIL IN POSITION	1 STANDARD DUAL INTERNAL S.V.	1 SINGLE-PHASE 230 Vac 50/60 Hz	1 ANALOGUE CONTROL	1
2 FAIL-SAFE W/O PRESSURE TRANSMITTER	2 STANDARD INTERNAL S.V. & EXTERNAL S.V.	2 24Vdc (Not suitable for -50°C) 2A 24Vdc Aux Supply – 24Vdc	2 PAKSCAN	2 IECEx IIB (-40°C) 1B IECEx IIB (-50°C) 1C IECEx IIC (-20°C)
3 FAIL IN POSITION W/O PRESSURE TRANSMITTER	3 SLOW ACTING INTERNAL S.V.	3 3-PHASE 380-480 V 50/60 Hz (Not suitable for -50°C) 3A 3-PHASE 380-480V 50/60HZ Aux Supply – 24Vdc	3 PAKSCAN ANALOGUE INPUTS	3
4 DOUBLE ACTING	4 SLOW ACTING DUAL INTERNAL S.V.	4	4 MODBUS SINGLE CHANNEL	4
5 DOUBLE ACTING W/O PRESSURE TRANSMITTER	5 STANDARD INTERNAL S.V. & DUAL EXTERNAL S.V.	5	5 MODBUS DUAL CHANNEL	5
6	6 STANDARD INTERNAL NC S.V. & HARDWIRED INTERNAL N/O S.V.	6	6 PROFIBUS DUAL CHANNEL	6
7	7 STANDARD INTERNAL NC S.V. & HARDWIRED EXTERNAL N/O S.V.	7	7 DEVICENET	7
8	8 STANDARD DUAL HARDWIRED INTERNAL NO S.V.	8	8 FOUNDATION FIELDBUS	8
9	9 DOUBLE ACTING	9	9 PROFIBUS SINGLE CHANNEL	9

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SB-2 Part Number Structure

SB-2-abcde

a	b	c	d	e
0 FAIL-SAFE	0 STANDARD INTERNAL S.V.	0 SINGLE-PHASE 110-120 Vac 50/60 Hz	0 TWO-WIRE CONTROL	0
1 FAIL IN POSITION	1 STANDARD DUAL INTERNAL S.V.	1 SINGLE-PHASE 230 Vac 50/60 Hz	1 THREE-WIRE CONTROL	1
2 FAIL-SAFE W/O PRESSURE SWITCH	2 STANDARD INTERNAL S.V. & EXTERNAL S.V.	2	2	2 IECEx IIB
3 FAIL IN POSITION W/O PRESSURE SWITCH	3 SLOW ACTING INTERNAL S.V	3	3	3
4	4 SLOW ACTING DUAL INTERNAL S.V.	4	4	4
5	5 STANDARD INTERNAL S.V. & DUAL EXTERNAL S.V.	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Specific Conditions of Use

i. In accordance with clause 5.1 of IEC 60079-1, the critical dimensions of the flamepaths are:

Flamepath	Maximum Gap (mm)	Minimum L (mm)
Electrical Enclosure / Electrical Cover (SI-2.1)	0.15	26.2
Electrical Enclosure/Electrical Cover (SB-2)	0.15	26.2
Terminal Enclosure/ Terminal Cover (Short)	0.15	26.7
Terminal Enclosure/ Terminal Cover (Long)	0.15	26.7
Terminal Enclosure/ Terminal Cover (Short) (IIB only)	0.2	26.7
Terminal Enclosure/ Terminal Cover (Long) (IIB only)	0.2	26.7
Main Body / Terminal Bung	0.115	25.95
Motor Enclosure/ Motor Cover	0.15	27.00
Motor Flange/Enclosure	0.15	27.00
Motor Bushing / Motor Flange	-0.035	28.00
Motor Shaft / Motor Bushing	0.167 (note 1)	28.00

[Note 1] This is based upon a minimum gap specification 'k' of 0.05 mm in accordance with clause 8.1.2 of IEC 60079-1.

ii. All cover securing screws shall be stainless steel (A4-80) to ISO 4762.

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iii. When fitted with a polycarbonate window, the equipment shall be installed where the risk of impact upon the viewing window is low.

iv. Any installation must ensure that any external sources of heating or cooling, when combined with the local ambient temperature does not cause the maximum or minimum operating temperature of the equipment to be exceeded. The hydraulic system connected to the Electro-Hydraulic Power Units could provide an external heat source.

v. This equipment includes some external, non-metallic parts, including the outer protective coating. Cleaning must only be carried out with a damp cloth.

Conditions of Manufacture

i. Each device 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 EN 60079-1:2007. There shall be no permanent deformation or damage to the enclosure.

SI-2.1 Electro – Hydraulic Power Unit Gas Group IIC

Equipment	Hydrostatic overpressure test pressure applied	
	Bar	Lbf/in²
Terminal Cover (Long) sand cast	10.17	147.47
Pressure Transducer 1Ø	15.21	220.55
Pressure Transducer DC (3Ø)	14.04	203.58
Solenoid Valve Assembly	13.58	196.91

SI-2.1 Electro – Hydraulic Power Unit Gas Group IIB Short Cover

Equipment	Hydrostatic overpressure test pressure applied	
	Bar	Lbf/in²
Main Body Electrical Enclosure DC (3Ø)	17.54	254.33
Electrical Cover 1Ø (Makrolon ® Window)	15.70	227.65
Electrical Cover DC (3Ø) (Makrolon ® Window)	17.54	254.33
Terminal Cover (Long) sand cast	14.22	206.19
Terminal Bung 1Ø (Electrical enclosure side)	15.70	227.65
Terminal Bung DC (3Ø) (Electrical enclosure side)	17.54	254.33
Pressure Transducer 1Ø	15.70	227.65
Pressure Transducer DC (3Ø)	17.54	254.33
Solenoid Valve Assembly	16.00	232.00

SI-2.1 Electro – Hydraulic Power Unit Gas Group IIB Long Cover

Equipment	Hydrostatic overpressure test pressure applied	
	Bar	Lbf/in²
Main Body Electrical Enclosure DC (3Ø)	20.19	292.83
Electrical Cover –Gravity Cast (Long Cover/Makrolon Window)	20.19	292.83
Terminal Bung DC (3Ø) (Electrical enclosure side)	20.19	292.83
Pressure Transducer DC (3Ø)	20.19	292.83

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SB-2 Electro – Hydraulic Power Unit

Equipment	Hydrostatic overpressure test pressure applied	
	Bar	Lbf/in²
Electrical Cover	14.82	214.89
Pressure Switch	14.82	214.89
Solenoid Valve Assembly	16.00	232.00

Long Cover version only approved for -20°C IIB DC & 3Ø

This certificate relies on the following previously certified products. When they are used as part of the SI-2.1 and SB-2, they shall still be covered by their original certificate:

Item	Certificate No	Key attributes
Bartech Line Bush 07-911-Z10FMXU1	IECEx EPS 13.0045U	Rev 2, II 2 G Ex db IIC Gb, Thread ¾" NPT Cable Type 2 x 1.5 mm² & 8 x 0.5 mm² RADOX 125 690 V, 644 A -60 °C ≤ TS≤ +110 °C, Application rate reference pressure 32.4 bar

Full certificate change history

Issue 1 - This variation introduced the following changes:

i. The Applicant's name and address was changed from Rotork Fluid Systems (A Division of Exeeco Ltd), Regina House, Ring Road, Bramley, Leeds, LS13 4ET, UK, to that shown on page 1.

Issue 2 - This variation introduced the following changes:

i. The introduction of a long electrical cover and associated PCB.
ii. An increase in the terminal lid flamepath gap dimension from 0.15 mm to 0.2 mm.
iii. The Description, Conditions of Certification and Conditions of Manufacture were amended to reflect these changes.

Issue 3 - This variation introduced the following changes:

i. SI-2.1- increase in the ambient temperature range from +60ºC to +65ºC.
ii. Modifications to the 'k' and 'm' dimensions associated with the motor shaft flamepaths.
iii. SI-2.1 – introduce an alternative terminal cover (long) manufactured in LM25-TF (heat treated)- BS 1490.
iv. SB-2 introduce an alternative electrical cover manufactured in LM25-TF (heat treated)- BS 1490.
v. SI-2.1 and SB-2 introduction of alternative motor types.
vi. Drawing amendments to address the above modifications, and certain other minor modifications as detailed.

Issue 4 - This variation introduced the following changes:

i. Amendments to the certification code marking (as illustrated on the certificates) to align the style with that applied to other certificates held by the same manufacturer.

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Issue 5 - This variation introduced the following changes:

i. Update approval standards to latest versions
   - IEC 60079-0:2007 to IEC 60079-0:2017
   - IEC 60079-1:2007 to IEC 60079-1:2014 +CORR1:2018 Ed 7.0
   - IEC 60079-7:2006 to IEC 60079-7:2015 +AMD1:2017 Ed. 5.1

ii. Introduction of an alternative Short Terminal Cover 46754 and 46754CH CASTING, TERMINAL COVER (Gravity Die Cast) Aluminium BS EN 1706-AC-42000-K-T6 (LM25TF) DC and single phase versions.

iii. Drawing amendments to address changes covered by this variation along with minor editorial changes and corrections, e.g. correct supplier/manufacturer details, remove “SMP” from drawing references, update material references to a common format.

iv. The marking in section on page 1 of the certificate was modified to more clearly define the information that is applied by the manufacturer.

v. The description was amended to remove the specific metallic content of the aluminium alloy used to make the outer enclosure components.

Issue 6 - This variation introduced the following changes:

i. Introduce alternative cable feedthrough covered by IECEx EPS 13.0045U.

ii. Correction of material reference for part HPU-834 (centre housing).

iii. The applicant’s name has changed to Rotork UK Ltd.

Issue 7 - This variation introduced the following changes:

i. The QAR reference has now been changed from GB/SIR/QAR07.0033/08 to GB/CSAE/QAR22.0009/00, no ExTR was raised.

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