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 05.0051X**

Status: **Current**

Issue No: 10

Date of Issue: 2021-06-09

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

Certificate history:
Issue 9 (2020-07-03)
Issue 8 (2018-10-25)
Issue 7 (2017-09-20)
Issue 6 (2016-10-13)
Issue 5 (2016-07-07)
Issue 4 (2014-09-25)
Issue 3 (2014-07-07)
Issue 2 (2011-05-04)
Issue 1 (2009-04-02)
Issue 0 (2006-03-08)

Equipment: **SI - 1 and SB-1 Electro-Hydraulic Power Units**

Optional accessory:

Type of Protection: **Flameproof db, Encapsulation mb and Increased Safety eb**

Marking: **SI - 1 Electro-Hydraulic Power Unit**
Ex db mb eb[1] IIB Gb T4 Ta -35°C to +65°C
Ex db mb eb[1] IIC Gb T4 Ta -20°C to +65°C
SB-1 Electro-Hydraulic Power Unit
Ex db mb eb[1] IIB Gb T4 Ta -35°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: **Neil Jones**

Position: **Certification Manager**

Signature:
(for printed version)

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 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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Certificate No.: **IECEx SIR 05.0051X**

Date of issue: 2021-06-09

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Manufacturer: **Rotork (UK) Ltd**
9 Brown Lane West
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Additional manufacturing locations:

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 60079-18:2017 Explosive atmospheres - Part 18: Protection by encapsulation "m"
Edition:4.1

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/SIR/ExTR06.0029/00
GB/SIR/ExTR09.0042/00
GB/SIR/ExTR11.0086/00
GB/SIR/ExTR14.0146/00
GB/SIR/ExTR14.0224/00
GB/SIR/ExTR16.0132/00
GB/SIR/ExTR17.0200/00
GB/SIR/ExTR18.0190/00
GB/SIR/ExTR20.0122/00
GB/SIR/ExTR21.0094/00

Quality Assessment Report:

GB/SIR/QAR07.0033/08

IECEx ATR: **File reference:**

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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 supply of the Units is:
SI-1:
24 Vdc (± 10%)
115/230 Vac, 50/60Hz single-phase (±10%)
380-480 Vac, 50/60Hz 3-phase (±10%)
SB-1:
115/230 Vac, 50/60Hz single-phase (±10%)

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

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Equipment (continued):

The Power Unit consists of three distinct enclosures, which are separated by the centre housing casting. The enclosure is made from cast aluminium alloy. The electrical enclosure, which has been designed to meet the requirements of Ex 'd' type of protection, can contain the following equipment:
SI-1 - a display window, control PCB, power PCB, transformer and pressure transducer
SB-1 - 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 oil reservoir contains two oscillating pumps and either one or two solenoid valves. The pump coils are designed to meet the requirements of Ex 'm' type of protection and are protected by a thermal fuse, which is manufactured to permanently rupture at 136^{o}C (110/230 Vac) and 133^{o}C (24 Vac). The solenoid valve coils are also designed to meet the requirements of Ex 'm' type of protection and are protected by a thermal fuse, which is manufactured to permanently rupture at 136^{o}C (110/230 Vac) and 136^{O}C (24 Vdc). Connection between the electrical enclosure and the oil reservoir is made with threaded bushings, which are designed to meet the requirements of Ex 'd' type of protection.
Refer to the Certificate Annexe for Product Code Breakdown.

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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)
This issue, Issue 10, recognises the following changes; refer to the certificate annex to view a comprehensive history:

1. De-list the following drawings from the scheduled drawing list.
   2038485 2038511 2043361
2. Change the Applicant name on the certificates to: Rotork (UK) Ltd.

Annex:

IECEx SIR 05.0051X Issue 10 Annexe .pdf

Product Code Breakdown - SI-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**	
2 **FAIL-SAFE W/O PRESSURE TRANSMITTER**	**2** **STANDARD INTERNAL S.V. & EXTERNAL S.V.**	**2** **24Vdc** 2A 24Vdc Aux Supply – 24Vdc	**2** **PAKSCAN**	**2 IECEx IIB** **2C IECEx IIC**
3 **FAIL IN POSITION W/O PRESSURE TRANSMITTER**	**3** **SLOW ACTING INTERNAL S.V.**	**3** **3-PHASE** **380-480V 50/60Hz** 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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Product Code Breakdown - SB-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** **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**	
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. The maximum constructional gap (I_c) is less than that required by Table 2 of EN 60079-1:2007 as detailed below:

SI-1 Electro- Hydraulic Power Unit Gas Group IIC

Flamepath	Maximum Gap (mm)	Minimum L (mm)
Electrical Enclosure / Electrical Cover	0.15	26.2
Terminal Enclosure/ Terminal Cover (Short)	0.15	26.7
Terminal Enclosure/ Terminal Cover (Long)	0.15	26.7
Main Body / Terminal Bung	0.115	25.95

SI-1 Electro- Hydraulic Power Unit Gas Group IIB and SB-1 Electro- Hydraulic Power Unit

Flamepath	Maximum Gap (mm)	Minimum L (mm)
Electrical Enclosure / Electrical Cover	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) (SI-1 only)	0.2	26.7
Terminal Enclosure/ Terminal Cover (Long) (SI-1 only)	0.2	26.7
Main Body / Terminal Bung	0.115	25.95

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

iii. When fitted with a window manufactured in Makrolon® 6717 this equipment shall only be installed where the risk of impact upon the viewing window is low.

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

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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-1 Electro- Hydraulic Power Unit Gas Group IIC

Equipment	Hydrostatic Overpressure Test Pressure	
	bar	lbf/in²
Terminal Cover (Long) sand cast	10.17	147.47
Line Bushing 1∅	15.21	220.55
Line Bushing DC (3∅)	14.04	203.58
Pressure Transducer 1∅	15.21	220.55
Pressure Transducer DC (3∅)	14.04	203.58

SI-1 Electro- Hydraulic Power Unit Gas Group IIB Short Cover

Equipment	Hydrostatic Overpressure Test Pressure	
	bar	lbf/in²
Terminal Cover (Long) sand cast	14.22	206.19
Electrical Cover 1Ø (Makrolon ® Window)	15.70	227.66
Electrical Cover DC (3∅) (Makrolon ® Window)	17.54	254.33
Terminal Bung	17.54	254.33
Line Bushing 1∅	15.70	227.65
Line Bushing DC (3∅)	17.54	254.33
Pressure Transducer 1∅	15.70	227.65
Pressure Transducer DC (3∅)	17.54	254.33

SI-1 Electro- Hydraulic Power Unit Gas Group IIB Long Cover

Equipment	Hydrostatic Overpressure Test Pressure	
	bar	lbf/in²
Electrical Cover –Gravity Cast (Long Cover/Makrolon Window)	**20.19**	**292.83**
Centre Housing – Sand Cast (Electrical Enclosure)	**20.19**	**292.83**
Terminal Bung	**20.19**	**292.83**
Line Bushing DC (3∅)	**20.19**	**292.83**
Pressure Transducer DC (3∅)	**20.19**	**292.83**

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

SB-1 Electro- Hydraulic Power Unit

Equipment	Hydrostatic Overpressure Test Pressure	
	bar	lbf/in²
Electrical Cover	14.82	214.90
Pressure Switch	14.82	214.90
Line Bushing	14.82	254.33

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iii. Every encapsulated device shall be subject to the following routine test as part of the manufacturing process:

- Visual check according to clause 9.1 of EN 60079-18:2009

iv. The following encapsulated devices shall be subject to the following routine electric strength test according to clause 9.2 of IEC 60079-18 as part of the manufacturing process:

- **HPU-A428/2045240 and HPU-A431/2038486** - A test voltage of 1500 Vrms shall be applied between all circuits that are encapsulated and any external metal parts. The test voltage is to be applied for at least 1 second. There shall be no evidence of electrical breakdown or flashover. Alternatively, 1.2 x the test voltage may be applied for 100 ms.
- **HPU-A609/2043322 and HPU-A610/2045241** - A test voltage of 500 Vrms shall be applied between all circuits that are encapsulated and any external metal parts. The test voltage is to be applied for at least 1 second. There shall be no evidence of electrical breakdown or flashover. Alternatively, 1.2 x the test voltage may be applied for 100 ms.
- **HPU-A669 and HPU-A670: -**
  - **24Vac/24Vdc -** A test voltage of 500 Vrms shall be applied between all circuits that are encapsulated and any external metal parts. The test voltage is to be applied for at least 1 second. There shall be no evidence of electrical breakdown or flashover. Alternatively, 1.2 x the test voltage may be applied for 100 ms
  - **110/230 Vac** -A test voltage of 1500 Vrms shall be applied between all circuits that are encapsulated and any external metal parts. The test voltage is to be applied for at least 1 second. There shall be no evidence of electrical breakdown or flashover. Alternatively, 1.2 x the test voltage may be applied for 100 ms

Full certificate change history:

Issue 1 – this Issue introduced the following change:

1. The introduction of an alternative thermal fuse type.

Issue 2– this Issue introduced the following changes:

1. The recognition of the following changes to the SI-1 Electro- Hydraulic Power Unit:
   * The introduction of a Gas Group IIC variant for use in an ambient temperature range of -20°C to +60°C.
   * The exemption from some routine overpressure testing relating Gas Group IIB.
   * The recognition of an alternative control board (SMP-00-50825) on the IIB and IIC versions.
   * The higher upper ambient temperature on the IIB versions was increased from +60°C to +65°C.
2. The introduction of the SB-1 Electro- Hydraulic Power Unit for use with Gas Group IIB in an ambient temperature range of -35°C to +60°C.
3. The recognition of the following changes, these are applicable to both the SI-1 and SB-1 Electro-Hydraulic Power Units:
   * Following appropriate re-assessment to demonstrate compliance with the requirements of the latest version of the standards, the original documents were replaced by those currently listed, the markings were updated accordingly.
   * The use of an alternative, electrical enclosure window made from a plastic material, this window has a clear film, SLX polycarbonate over-mould added to its outer face.
   * The introduction of an alternative terminal cover, part no 48870.
   * The use of an alternative terminal bung material.
   * The recognition of a company name change, from Rotork Skilmatic (A Division of Exeeco Ltd) to Rotork Fluid Systems (A Division of Exeeco Ltd).
   * The modification of the product description, marking code and the code breakdown table to recognise changes associated with this variation.

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Issue 3– this Issue introduced the following change:

1. 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 4 – this Issue introduced the following changes:

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

Issue 5 – this Issue introduced the following changes:

1 SI-1- increase in the ambient temperature range from +60ºC to +65ºC for IIC Gas Groups
2 SI-1 – introduce an alternative terminal cover (long) manufactured in LM25-TF (heat treated)- BS 1490
3 SB-1 introduce an alternative electrical cover manufactured in LM25-TF (heat treated)- BS 1490
4 Drawing amendments to address the above modifications, and other minor modifications as detailed.
5 Removal of Rotork Controls Inc. as an alternative manufacturing facility.

Issue 6 – this Issue introduced the following change:

1 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.

Issue 7 – this Issue introduced the following change:

1 The introduction of an alternative material of manufacture for the main centre housing – Aluminium alloy –BS EN 1706 AC-42000-S-T6 (LM25TF Heat Treated).

Issue 8 – this Issue introduced the following change:

1 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
   - IEC 60079-18:2006 to IEC 60079-18:2014 +AMD1:2017 Ed. 4.1
2 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.
3 Introduction of an alternative Thermal Fuse – Type SF-129R-1, Schott Japan Corporation. HPU-800.
4 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.
5 The description was amended to remove the specific metallic content of the aluminium alloy used to make the outer enclosure components.

Issue 9 – this Issue introduced the following changes:

1 Addition of alternative encapsulated pump coils, types 2038486 & 2043322.
2 Addition of alternative thermal fuse type 2045016 (Existing HPU-555).
3 Addition of alternative solenoid valve coil assembly drawings 2045240 and 2045241 due to use of alternate thermal fuse 2045016.
4 The Conditions of Manufacture were amended to reflect the above changes.

Issue 10– this Issue introduced the following changes:

1 De-list the following drawings from the scheduled drawing list.
2038485 2038511 2043361
2 Change the Applicant name on the certificates to: Rotork (UK) Ltd.

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