IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres

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Certificate No.: **IECEx NEP 20.0003X** Page 1 of 3 Certificate history:

Status: **Current** Issue No: 0

Date of Issue: 2020-02-25

Applicant: **RAE Systems, Inc., A Honeywell Company.**
1349 Moffet Park Drive
Sunnyvale
CA 94089
United States of America

Equipment: **BW RigRat Local Area Gas Monitor, Model BWRR100 series**

Optional accessory:

Type of Protection: **Ex d, i**

Marking: Ex ia IIC/IIB T4 Ga

Ex da ia IIC/IIB T4 Ga

Ex db ia IIC/IIB T4 Gb

Ex marking and T_{amb} , refer to annex for details.

Approved for issue on behalf of the IECEx Certification Body: **Xu Jianping**

Position: **Managing Director**

Signature: (for printed version)

Date: 25 Feb., 2020

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Certificate issued by:

Shanghai Inspection and Testing Institute of Instruments and Automatic Systems Co., Ltd. (SITIIAS)/
National Supervision and Inspection Center for Explosion Protection and Safety of Instrumentation (NEPSI)
103 Cao Bao Road
Shanghai 200233
China

Ex NEPSI

SITIIAS Worldwide Access

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Manufacturer:
RAE Systems, Inc., A Honeywell Company
1349 Moffett Park Drive
Sunnyvale, CA 94089
United States of America

Additional manufacturing locations:

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Avenida Valle de Cedro #1681 Parque
Industrial Intermex Ciudad Juarez,
Chihuahua, Mexico 32574
Mexico

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 60079-11:2011 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
Edition:6.0

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:

CN/NEP/ExTR20.0003/00

Quality Assessment Reports:

GB/SIR/QAR11.0027/06
NO/PRE/QAR16.0005/01
NO/PRE/QAR16.0006/01
NO/PRE/QAR17.0018/00
US/UL/QAR07.0003/11

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

Refer to Annex.

SPECIFIC CONDITIONS OF USE: YES as shown below:

1. The AC charger system of BWRigRat shall only be applied in non-hazardous area by charger specifically supplied for use with the unit (for example model number ADS-25SGP-06 05717E, manufactured by HONOR ELECTRONIC CO.,LTD.), approved as SELV or Class 2 equipment against IEC 60950 or an equivalent IEC standard. The maximum voltage Um from the charger shall not exceed DC 6.0V.
2. The BW RigRat enclosure has an ingress protection of rating of IP54. The user shall ensure that the external plugs that used for IS charger, 4~20mA input and ON-OFF switch will provide a degree of protection of IP54, after they are connected to the sockets.
3. Do not open when an explosive atmosphere is present.

Annex:

IECEx NEP 20.0003X Annex.pdf

As a transportable equipment, the BW RigRat Local Area Gas Monitor (hereinafter called "RigRat") fills the gap between portable personal detectors and fixed-infrastructure fire and gas systems. Its primary function is to alert personnel of a gas leak in their proximity, it can provide continuous measurement of gas concentrations.

The overall dimensions of the RigRat is about 400mm×290mm×470mm, it consists of a enclosure, 2 rechargeable battery packs 500-0165-000 as main power, 1 Li-ion rechargeable cell MS-621T for RTC power, 1 LCD display, 4 LED indicators for light alarm, 2 buzzers for sound alarm, 1 multi-function button, and PCBAs. Additionally, it may also be optionally equipped with a gas-sucking pump, up to 6 kinds of wireless modules fitted in 4 wireless module slots, up to 5 kinds of sensors fitted in 6 sensor slots.

The enclosure is composed of the front and back PC/PBT housing covers, bottom base made of conductive TPU, stainless steel 316 side frame, and the upper stainless steel handle wrapped with conductive TPU. In addition there is a layer of conductive film attached at the surface of the LCD display.

AC charger connector is provided to charge the battery packs in a non-hazardous area, refer to "Specific Conditions of Use" for more information. IS charger connector is used to connect through a safety barrier to charge one of the battery packs in hazardous area, likewise providing the intrinsically safe power to the product.

Wireless module configuration:

Depending on the configuration, the RigRat may provide GPS, GNSS, Mesh, WIFI, BLE, LoRa, and/or NB-IoT wireless communication, the possible configurations are shown in the table as below.

Designator on PCB	U19	J7	J9	J8
BLE	●			
either WIFI or NB-IoT			●	
either Mesh or LoRa		●		
either GPS or GNNS				●

● Show possible fitted location of wireless modules

Sensor configuration:

The RigRat may be configured with MIPEX NDIR sensor, DYNAMENT NDIR sensor, LEL sensor, PID sensor, and EC sensor, which are mounted inside the IP54 enclosure of RigRat. These sensors have been separately certified or tested according to IEC 60079. See below table for more information about these sensors. Satisfactory assessment is carried out within

the report (CN/NEP/ExTR20.0003/00) to cover the major differences between latest Standards and the Standards listed in the table as below to prove that they can meet the requirements of latest Standards.

Sensor	Type	Ex marking	IECEx CoC or ExTR	Ambient temperature (℃)	Standard
EC	4R+EC	Ex ia II C T4 Ga	GB/SIR/ExTR10.0276/00	-20~+55	IEC60079-0:2007 Edition5 IEC60079-11:2006 Edition5 IEC60079-26:2006 Edition2
MIPEX NDIR	MIPEX 02 series	Ex ia II C Ga	IECEx ITS 11.0047U Issue No.5	-55~+60	IEC60079-0:2011 Edition:6.0 IEC 60079-11:2011 Edition:6.0
Dynament NDIR	MSH2ia ***	Ex db II C Gb	IECEx FTZU 15.0002U Issue No.2	-20~+60	IEC60079-0:2011 Edition:6.0 IEC60079-1:2014-06 Edition:7.0 IEC60079-11:2011 Edition:6.0
PID	4R+PID	Ex ia II C T4 Ga	GB/SIR/ExTR10.0203/00	-20~+55	IEC60079-0:2007 Edition5 IEC60079-11:2006 Edition 5 IEC60079-26:2006 Edition2
LEL Sensor	1 LEL 75 x	Ex da ia II C Ga	IECEx ULD 16.0016U Issue No.1	-40~+60	IEC60079-0:2011 Edition6 IEC60079-1:2014-06 Edition7 IEC60079-11:2011 Edition6

For possible sensor installation, refer to the table as below.

	Slot1	Slot2	Slot3	Slot4	Slot5	Slot6
MIPEX NDIR Sensor	●					
Dynament NDIR Sensor	●	●		●		
PID Sensor		●				
LEL Sensor			●			
EC Sensor		●	●	●	●	●

● Show possible fitted location of sensors

EC Sensor: Max.5pcs

MIPEX NDIR Sensor: Max.1pc

PID Sensor: Max.1pc

LEL Sensor: Max.1pc

Dynament NDIR Sensor: Max.3pcs

Besides, there is a noise sensor located inside of the RigRat, which can measure the ambient noise. The RigRat also contains 1 THP sensor in pump version that can measure the ambient temperature, humidity and gas flow outside.

Electrical parameters

The RigRat provides 4 external connectors with following electrical parameters:

AC charger connector(use only in a non-hazardous area): Um=6V;

IS charger connector: Ui=24V, Ii=150mA, Pi=1.15W, Ci=0.36nF, Li=0;

ON-OFF switch connector: Ui=30V, Ii=100mA, Pi=0.75W, Ci=1.1nF, Li=0;

4~20mA input connector: Ui=30V, Ii=100mA, Pi=0.75W, Ci=0, Li=0.

Type designation

BWRR100 *a-b-c*

a identifies product version: D, P

D: Diffusion version (without pump)

P: Pump version

b identifies sensor configuration with regard to PID, Dynament NDIR and LEL sensor

0: Fitted without PID, Dynament NDIR or LEL sensor

1: Fitted with PID sensor

2: Fitted with Dynament NDIR sensor

3: Fitted with LEL sensor

4: Fitted with PID and Dynament NDIR sensor

5: Fitted with Dynament NDIR and LEL sensor

6: Fitted with LEL and PID sensor

7: Fitted with PID, Dynament NDIR, and LEL sensor

c identifies wireless modules configuration with regard to WIFI and NB-IoT

0: Fitted without WIFI or NB-IoT

1: Fitted with WIFI

2: Fitted with NB-IoT

3: Fitted with WIFI and NB-IoT

Depending on different configurations, the RigRat may refer to different types of protection, gas groups and ambient temperatures, which are specified as below. The onerous restriction shall be taken into consideration in case one of the followings is applied.

1. The first digit designates the Diffusion/Pump version. The following table details the Diffusion/pump version together with ambient temperatures.

Type	Version	Ambient Temperature(℃)
BWRR100 D-*b*-*c*	Diffusion version (without pump)	-40~+60
BWRR100 P-*b*-*c*	Pump version	-20~+60

2. The second digit designates the configuration of sensors with regard to PID, Dynament NDIR and LEL sensor. The following table details the sensor configurations together with the Ex markings and ambient temperatures.

Type	Sensor Configuration	Ex Marking	Ambient Temperature(℃)
BWRR100 *a*-0-*c*	without PID, Dynament NDIR or LEL	Ex ia II C T4 Ga	-40 ~+60
BWRR100 *a*-1-*c*	with PID	Ex ia II C T4 Ga	-20 ~+55
BWRR100 *a*-2-*c*	with Dynament NDIR	Ex db ia II C T4 Gb	-20 ~+60
BWRR100 *a*-3-*c*	with LEL	Ex da ia II C T4 Ga	-40 ~+60
BWRR100 *a*-4-*c*	with PID and Dynament NDIR	Ex db ia II C T4 Gb	-20 ~+55
BWRR100 *a*-5-*c*	with Dynament NDIR and LEL	Ex db ia II C T4 Gb	-20 ~+60
BWRR100 *a*-6-*c*	with LEL and PID	Ex da ia II C T4 Ga	-20 ~+55
BWRR100 *a*-7-*c*	with PID, Dynament NDIR and LEL	Ex db ia II C T4 Gb	-20 ~+55

3. The third digit designates the configuration of wireless modules with regard to WIFI and NB-IoT. The following table details the wireless module configurations together with the gas groups.

Type	Wireless Module Configuration	Gas Group
BWRR100 *a*-*b*-0	without WIFI or NB-IoT	II C
BWRR100 *a*-*b*-1	with WIFI	II B
BWRR100 *a*-*b*-2	with NB-IoT	II B
BWRR100 *a*-*b*-3	with WIFI and NB-IoT	II B