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SPEED POST/COURIER SERVICE

No. CIMFR/TC/P/
ID NO. 374/16

3024

Dated: 24 January, 2019
CODE NO. FLP/10/17-18

To,
M/s. Aira Euro Automation Pvt. Ltd.,
Plot No. 123/124, Aira Estate, Behind Security Estate,
Nr Kashiram Testile Mill, Narol,
Ahmedabad-382405 (Gujarat), India

Sub: Intrinsically Safe Testing as per IS/IEC 60079-11:2006 of your **Electro Pneumatic Positioner** as designated by **Model No.: AEP-1000-RDN** for use in Gas Group: IIC atmosphere.

- Report on (Prototype)

Your Ref. No.: AIRA/102/EPP-IS-01

Date: 16/11/2016

Dear Sir,

Please find the enclosed Test Report (**Prototype**) of the above sample, submitted by you.

Charges of **Rs. 20,781/- (Rupees Twenty thousand Seven hundred & Eighty one)** only including applicable service tax involved towards the testing/issuing the schedule have been adjusted against the advance deposit made by you.

This Institute reserves the right to review, amend or withdraw this report at any time if considered necessary in the interest of safety.

Kindly arrange to collect the sample within 90 days from the date of receipt of this letter failing which CIMFR would dispose of the sample by public auction without any further NOTICE to you.

Kindly acknowledge the receipt.

Thanking you.

Encl: As above.

Test Report in Triplicate

Copy to: 1. HOS, Flameproof & Equipment Safety
2. Bill Section.

Yours faithfully,

Handal
23/01/2019

(S. K. MONDAL)
HOS
TESTING CELL



सीएसआईआर-केन्द्रीय खनन एवं ईंधन अनुसंधान संस्थान

CSIR-Central Institute of Mining and Fuel Research

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)

(Council of Scientific & Industrial Research)

बरवा रोड, धनबाद-826015, झारखण्ड, भारत

Barwa Road, Dhanbad - 826015, Jharkhand, India

ज्वालासह एवं उपकरण सुरक्षा / FLAMEPROOF & EQUIPMENT SAFETY

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NABL, Certificate No.: TC-5962

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[FORM NO.: CIMFR: DQM: FLP02: F-02]
(Flameproof & Equipment Safety)

TEST & ASSESSMENT REPORT

Proto Report No.: CIMFR/TC/P/ 3024	Dated: 24 January, 2019
Equipment ID NO.: 374/16	Code No.: FLP/10/17-18
Application Ref. No.: AIRA/102/EPP-IS-01	Date: 16/11/2016

1. Applicant & Manufacturer:

Applicant	Manufacturer
M/s. Aira Euro Automation Pvt. Ltd., Plot No. 123/124, Aira Estate, Behind Security Estate, Nr Kashiram Testile Mill, Narol, Ahmedabad-382405 (Gujarat), India	M/s. Aira Euro Automation Pvt. Ltd., Plot No. 123/124, Aira Estate, Behind Security Estate, Nr Kashiram Testile Mill, Narol, Ahmedabad-382405 (Gujarat), India

- Name of the Equipment:** Electro Pneumatic Positioner.
- Designated by** : Model No.: AEP-1000-RDN
- Gas Group** : IIC atmosphere
- Electrical ratings:** 24V DC, 1.32Watt, 4-20mA, Isc ≤55mA.
- Temperature Class:** T6 at 40°C ambient
- Degree of Ingress Protection of enclosure:** IP-43
- Material of Construction of enclosure:** Pressure die Cast Aluminium alloy.

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14. Testing and Assessment of Intrinsically safe Equipment:

(I) Description

1. Connect power source operating 4 to 20 mA. at 24V DC. As signal current (4 to 20mA) from the controller increases, the plate spring of the torque motor works as a pivot. As the armature receives the rotary torque in the counter-clockwise direction, the counter-weight is pushed to the left, the clearance between the nozzle and the flapper will increase. As a result, the exhaust valve of the pilot valve moves to the right, and the output pressure of out I increase (as OUT 2 decreases) to move the actuator.

2. The movement of the actuator in turn rotates the feedback shaft, and the spring lengthens or shortens by the movement of the feedback cam connected to the feedback shaft. The actuator stays in the position where the spring balanced with the force generated by the input current in the torque motor. The compensation spring is for direct feedback of the motion of the exhaust valve and is connected to the counter-weight to enhance the stability of the loop. The zero point is adjusted by changing the zero adjustment spring tension.

(i) Spark Ignition compliance: In order to comply with 10.1, i.e spark ignition test, an output of electro pneumatic positioned (24V DC)/20mA) is assessed as per 10.11 safety was deduced from the reference cover, figure A.1 to A.6 or tables A.1 and A.2, by the methods described in Annex A. It complies

(ii) Temperature Class: There was no measurable temperature rise in normal working condition for equipment circuit. The assessment of intrinsically safe circuit optimum power is less than 1.3W. Hence the temperature class of T6 may be acceptable to the circuit with respect to the 40°C ambient.

(iii) Creepage Distance & Clearance: Creepage distance and clearance between the connecting terminals is greater than 2mm and complies with IS/IEC 60079-11:2006. Minimum track clearance on the PCB is 2.54mm and PCB (1.5mm thickness) is tin plated 35micron copper claded fiber glass PCB. The CTI value is 400V.

(iv) Insulation Test: The insulation between intrinsically safe circuit and the housing withstood test voltage of 500V rms for one min.

(v) Impact Test: One kg mass of hardened steel fallen vertically on the surface of the enclosure on the surface to create impact energy for Gas Gr. I equipment as per IS/IEC 60079-0:2011. No damage observed after this test.

(vi) Enclosure and IP-Protection: The material of construction of the enclosure is Aluminium Alloy LM2. A Neoprene NBR gasket is provided at the end of joint for IP-43 degree of protection. The enclosure is complies IP 43 as per IS/IEC 60529-2001.

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(Flameproof & Equipment Safety)

Proto Report No. CIMFR/TC/P/ 3024

Dated: 24 January, 2019

ID NO.: 374/16

CODE NO.: FLP/10/17-18

TEST & ASSESSMENT REPORT**I. Date of Test: 10/09/2018****II. Test Equipment Used:** High voltage test, Digital multimeter, Impact & Temperature class test setup.**Result #A: Test & Assessment as per IS/IEC 60079-0:2011:**

Clause	Requirement-Test	Result-Remark Verdict (Complies, NA-Not Applicable, Fail)	
1	Scope	Complies	
2	Normative references	Complies	
3	Terms and definitions	Complies	
4	Equipment grouping and temperature classification	Gas Group IIC, T6	
5	Temperatures ambient	-20 °C to 40 °C	
6	Requirements for all electrical equipment	Complies	
6.6	Electromagnetic and ultrasonic energy radiating equipment.	NA	
7	Non-metallic enclosures and non-metallic parts of enclosures	As declared by applicant	Complies
7.4	Electrostatic charge on external non-metallic materials	NA	
8	Enclosure containing light metal	Mg. 0.22	Complies
9	Fasteners	Complies	
10	Interlocking devices	NA	
11	Bushings	NA	
12	Materials used for cementing	NA	
13	Ex components	NA	
14	Connection facilities and termination compartments	NA	
15	Connection facilities for earthing or bonding conductors	NA	
16	Entries into enclosures	NA	
17-22	Supplementary requirements for rotating electrical machines, switchgear, fuses, plugs, sockets, outlets and connectors, luminaries and cap lights and hand lights.	NA	
23	Equipment's incorporating cells and batteries	NA	

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24	Documentation	Complies	
25	Compliance of prototype or sample with documents	Complies	
26	Type tests		
26.3	Tests in explosive test mixtures Verification for compliance to intrinsic safety (Ex 'i') as per IS/IEC 60079-11-2006	Complies As per Result #B	
26.4	Test of enclosures		
26.4.2	Resistance to Impact	Complies	
26.4.3	Drop test	NA	
26.4.5	Test for Degree of protection (IP) by enclosures (Ability to prevent ingress of dust & water as per IS/IEC 60529:2001)	IP 43	Complies
26.5	Thermal tests		
26.5.1	Temperature measurement	T6	Complies
26.5.2	Thermal shock test – for glass parts	NA	
26.5.3	Small components ignition test	Complies	
26.6	Torque test for bushings	NA	
26.7	Test Non- metallic enclosures or non-metallic parts of enclosures		
26.8	Thermal endurance to heat	As declared by applicant	Complies
26.9	Thermal endurance to cold		
26.10	Resistance to light	NA	
26.11	Resistance to chemical agents for Group I electrical equipment	NA	
26.12	Earth continuity test via non-metallic enclosure	NA	
26.13	Surface resistance test of parts of enclosures of Non-metallic materials	NA	
26.14	Charging tests	NA	
26.15	Measurement of Capacitance	NA	
27	Routine tests	Conformity of the equipment to the applicable standard as per proto type sample of test report.	
28	Manufacturer's responsibility		
29	Marking	Ex 'ib' IIC T6 IP-43	
30	Instructions	Instruction related to use installation, maintenance, adjustment to be provided by the manufacturer along with equipment.	

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Result #B: Test & Assessment as per IEC 60079-11:2006.

Clause	Requirement-Test	Result-Remark Verdict (Complies, NA-Not Applicable, Fail)
1	Scope	Complies
2	Normative references	Complies
3	Terms and definitions	Complies
4	Grouping and classification of intrinsically safe equipment and associated equipment	Gas Group IIC & T6
5	Levels of protection and ignition compliance requirements of electrical equipment	Ex 'ib'
5.5	Spark ignition compliance	Complies
5.6	Thermal ignition compliance	Complies
5.7	Simple equipment & associated equipment	Complies
6.	Equipment construction	
6.1	Enclosures	Complies
6.2	Facilities for connection of external circuits	Complies
6.3	Separation distances of conducting terminal	Complies
6.4	Protection Against Polarity Reversal	Complies
6.5	Earth conductors, connections and terminals	NA
6.6	Encapsulation	NA
7	Components on which intrinsic safety depends	
7.1	Rating of components	Complies
7.2	Connectors for internal connections, plug-in cards and components	NA
7.3	Fuses	NA
7.4	Primary and secondary cells and batteries	NA
7.5	Semiconductors	NA
7.6	Failure of components, connections and separations	NA
7.7	Piezo-electric devices	NA
7.8	Electrochemical cells for the detection of gases	NA
8	Infallible components, assemblies & connections on which intrinsic safety depends	
8.1	Mains transformer	NA
8.2	Transformer other than mains transformers	NA
8.3	Infallible winding	NA
8.4	Current-limiting resistors	NA
8.5	Blocking capacitors	NA
8.6.	Shunt safety assemblies	NA
8.7	Wiring, printed circuit board tracks, and connections	Complies
8.8	Galvanically separating components (Isolating components between IS and Non-IS circuits)	NA

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9	Diode safety barriers	NA
10	Type verifications and type tests	
10.1	Spark ignition test No ignition has occur in any test series at any chosen test point	Complies
10.2	Temperature tests	T6, Complies
10.3	Dielectric strength tests (Insulation test, high voltage test)	Complies
10.5	Test for cells and batteries (Spark Test)	Complies
10.6	Mechanical tests (Enclosure)	Complies
10.7	Tests for equipment containing piezoelectric devices	NA
10.8	Type tests for diode safety barriers & safety shunts	NA
10.9	Cable pull test	NA
10.10	Transformer tests	NA
11	Routine verifications and tests	To be conducted by the manufacturer as per proto test report)
12	Marking	Ex 'ib' IIC T6 IP-43
12.3	Warning markings (As per standard)	Complies
13	Documentation	Complies
Annex A	Testing & Assessment of intrinsically safe circuits (See report section 14.0)	Complies

CONCLUSION: In view of the above observations the **Electro Pneumatic Positioner** as designated by **Model No.: AEP-1000-RDN** considered to be intrinsically safe for use in Gas Group: IIC atmosphere and belongs to category 'ib' with Temperature Class **T6** at 40°C ambient as per IS/IEC 60079-11:2006.

Reported By

वी.प्रसाद

(PRASAD BHUKYA)

Scientist

Dated: 23 January, 2019

Flameproof & Equipment Safety

CSIR - Central Institute of Mining & Fuel Research,

Barwa Road, DHANBAD – 826 015,

(JHARKHAND) INDIA

Checked & Approved By

अरविन्द कुमार सिंह

(A. K. SINGH)

HOS

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