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# Karandikar Laboratories



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## TYPE EXAMINATION REPORT

Electrical Apparatus for Explosive Atmospheres

03 TE Report Number: **KLPL/Ex/R/10-006X** Dated. **29<sup>th</sup> December 2010**

04 Electrical Apparatus: **Flameproof Pressure / Temperature Switch**  
**(ORION Brand – Model FC / FA / FM)**

05 Manufacturer: **Kaustubha Udyog.**  
06 Address: 7, Parichaya Society, 1000/6D,  
Navi Peth, Pune 411 030, India.

07 This equipment and any acceptable variation thereto are specified in the schedule to this TE Report and the documents therein referred to.

08 *Karandikar Laboratories Pvt. Ltd.* certifies that this equipment has been found to comply with requirements of the following standards relating to the design and construction of electrical apparatus for explosive gas atmospheres.

The equipment was taken up for recertification based on the compliance already established by ERTL(E) for compliance to IS 13346: 2004 & IS 2148-2004, vide their test report no. ERTL (E) / TES / K085 / 0084 / 02-08 dated 25-02-2008 for gas groups I, IIA, IIB, IIC.

This TE Report was issued as verification that a sample, representative of production, was assessed and tested and found to comply with the IS / IEC standards listed below.

**IS/IEC 60079-0: 2004**

**IS/IEC 60079-1: 2007**

**IS/IEC 60529:2001**

09 The Evaluation and Test results are recorded in KLPL's confidential report No.  
**KLPL / Ex / R / KU-10/001 Dated 29<sup>th</sup> December 2010.**

10 The sign X if placed after the TE Report number; indicates that the equipment is subject to special conditions of safe use specified in the schedule to this TE Report.

11 This TE Report **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the above listed standards.

12 The marking of the Equipment shall include the following:

**Exd I IIC T6 IP66 Gb Ta (-20°C to +60°C)**



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*R.K. Paranjpe*  
**R.K. Paranjpe - Director**

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**Karandikar Laboratories Pvt. Ltd.**

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TE Report No.: KLPL/Ex/R/10 – 006X

Date: 29<sup>th</sup> December 2010

## SCHEDULE

### 13. General Information:

The sample of the Pressure / temperature switch received was compared with the earlier drawings certified by ERTL (E) to ascertain its compliance with the product certified vide ERTL (E) test report no. ERTL (E) / TES / K085 / 0084 / 02-08 dated 25-02-2008 for gas groups I, IIA, IIB, IIC. The sample was found to comply with the ERTL approved and certified drawings as per IS 2148:2004. The sample received was examined against the requirements of IS/IEC 60079-0:2004 and IS/IEC 60079-1:2007, the details of which are given below.

The flameproof switch comprises of a cylindrical enclosure with a T shaped base and a circular threaded cover. The cover and the body are made of Aluminium alloy (LM6), with SS and grey cast Iron being the alternate material of construction. As per the requirements of the new standard the cover is locked by a SS grub screw. The cover and the body form a threaded flamepath with 17.2mm as the depth of engagement and more than 6 fully engaged threads. The gross volume of the enclosure is 480cc and the nett volume is 300cc max.

The microswitches are operated by a pushrod by the pressure sensing capsule attached to the enclosure base on a vented column. The pushrod enters the enclosure via a bushing that also provides an adjustment of the sensitivity by varying the pressure on a spring in the vented column. The various sensing capsules are separated from the vented column and the flameproof enclosure by a pressure tight membrane. The operating rod forms cylindrical flamepath of more than 25mm length and the maximum gap of 0.9mm meet the requirements of the standard.

IP 66 level of protection is achieved using Neoprene, Silicon or Viton rubber 'O' rings between the body and the cover and on the operating rod.

The Pressure switch enclosure cover has an SS 304 name cum Warning Label permanently fixed by a SS screw, giving all relevant details like certification details, manufacturer's details along with the warning – "Do Not Open When Energized".

#### Cable Entries

The enclosure has two 3/4<sup>th</sup> NPT threaded entry meant for cable connection. Other variations could be a 1/2" NPT / M20x1.5<sup>†</sup> cable entry as per the customer's requirement. This cable entry will always be mated with an appropriate Exd certified cable gland.

#### Earthing

Both internal and external earth connections are provided on the sample. As both connections are into the metallic body the earth connections are considered adequate.

† Typographical error: 1/4<sup>th</sup> NPT / M20 changed to 1/2" NPT / M20x1.5.

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## SCHEDULE

### 14. Model Designation:

The flameproof construction of the enclosure remaining the same, the pressure /temperature capsule configuration may change depending on the sensing elements required and desired pressure / temperature ranges.

Model	Enclosure	Rating
FC / FA / FM	Flameproof Pressure / Temperature Switch (Orion)	240Vac 15A

### 15. Temperature Class:

Temperature rise test in accordance to clause 26.5.1 of IS/IEC 60079-0:2004 was carried out at 110% of the rated supply. The maximum rise in surface temperature was recorded and the requested temperature class of T6 is considered acceptable even at the higher ambient.

### 16. Electrical Rating:

The enclosure is rated for an I<sub>max</sub> of 15A and V<sub>max</sub> of 240 Vac.

### 17. Drawings:

#### Old Certified Drawings: (to IS 2148:2004)

Number	Sheet	Issue & Rev.	Date	Description
A24 EE 001	1 of 2	LC No. 00	14-01-2007	Flameproof Pressure / Temperature Switches
A24 EE 001	2 of 2	LC No. 00	14-01-2007	Flameproof Pressure / Temperature Switches

#### New Certified Drawings: (to IS/IEC 60079-1:2007)

Number	Sheet	Issue & Rev.	Date	Description
A24 KL 001	1 of 2	LC No. 00	13-12-2010	Flameproof Pressure / Temperature Switches
A24 KL 001	2 of 2	LC No. 00	13-12-2010	Flameproof Pressure / Temperature Switches

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## SCHEDULE

### 18. Special Conditions of Safe Use:

- The gaps specified for the flamepaths of the pushrod and the bushing are more stringent than that allowed by the standard. The manufacturer should be consulted for values if required for maintenance etc.
- The cable gland / conduit entry or blanking plug used should be appropriately Exd certified.

### 19. Routine Tests:

The enclosure has been subjected to 4 times overpressure test and hence manufacturer need not subject each enclosure to routine pressure testing in accordance with clause 16.2 of IS / IEC 60079 -1: 2007



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