

# Test Certificate

CERTIFICATE No: TRA034946CC01

ISSUE: A

DATE: 14/02/2017

PURPOSE OF TEST: Ingress Protection – IP6X/IPX6/IPX7

CLIENT ORDER No: 28344

CLIENT: Rotork Midland Ltd, Patrick Gregory Road,  
Wolverhampton, West Midlands, WV11 3DZ, United  
Kingdom

EQUIPMENT UNDER TEST: 67 Series Solenoid Housing  
Valve Type: 1323M23-SM-ZKD  
Serial Number: 3310713  
Element Stores Number: TRA-034946-S1  
Receipt date: 30/01/2017

TEST SPECIFICATIONS: In accordance with quotation TRA-034946-02  
In accordance with BS EN 60529:1992+A2:2013

TEST DATE: 06/02/2017 to 07/02/2017

TEST LOCATION: Element Materials Technology, Rothwell Road, Warwick,  
Warwickshire, CV34 5JX

WRITTEN BY:



Sven Cumner  
Environmental Test  
Engineer

APPROVED BY:

Rob Sutton  
Verification  
Controller

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EMTEACC02

**TESTS CARRIED OUT:****IP4X - Protected Against Access to Hazardous Parts and Against Solid Foreign Objects**

Probe: 1.0<sup>+0.05</sup><sub>-0</sub> mm diameter x 100mm wire  
Force: 1N ± 10%

Any barriers, shapes and covers attached to or formed by the enclosure which could be removed without the use of a key or tool, were removed and the 100mm access probe was applied to assess if the 1mm diameter probe could gain access to the openings of the enclosure at a force of 1N.

**IP6X - Protected Against Access of Solid Foreign Objects - Dust Tight**

Duration: If extraction rate is 40-60 volumes per hour, duration is 2 hours.  
If extraction rate is less than 40 volumes per hour at a depression of ≤ -20mbar, test is continued until 80 volumes have been drawn through or 8 hours elapsed.

Maximum Flow rate: 60 times the volume of the EUT per hour

Maximum Vacuum: ≤ -20mbar

Note: All enclosures with first characteristic numeral 6 shall be deemed category 1.

The EUT was connected to a vacuum pump, pressure indicator and flow meter to calculate the test duration. The EUT was mounted in the dust chamber and re-connected to the vacuum pump to provide a vacuum of up to 20 mbar below laboratory ambient pressure during the test. The test was carried out in accordance with the specification for a period of 8 hours, as shown in Figure 1.

**IPX6 - Protected Against Powerful Water Jets**

Nozzle: 12.5 mm diameter

Flow Rate: 100 litres per minute ± 5%

Duration: 1 minute per m<sup>2</sup> of surface area of enclosure from all practicable directions (3 minutes minimum)

Distance: 2.5 to 3 metres

Water Temperature: Within ±5°C of equipment temperature

The temperature of the water and the EUT was measured to ensure the differential was within 5°C. The EUT was mounted in its normal operating orientation and sprayed from all practicable directions for a period of 3 minutes, as shown in Figure 2, in accordance with the specification.

**IPX7 – Temporary Immersion in Water**

Water Level: 1 metre above lowest point of enclosure

Duration: 30 minutes

Configuration: Non-Operational.

Water Temperature: Within ±5°C of equipment temperature

The temperature of the water and the EUT was measured to ensure the differential was within 5°C. The EUT was placed in to an immersion tank filled with water to a depth of 1 metre to the lowest surface of the EUT, as shown in Figure 3. The EUT was subjected to the test conditions for a period of 30 minutes.

**TEST RESULTS:****IP4X - Protected Against Access to Hazardous Parts and Against Solid Foreign Objects**

The EUT was found to have no openings that could be penetrated by the access probe of 1 mm Ø reducing adequate clearance between the access probe and hazardous parts.

**IP6X - Protected Against Access of Solid Foreign Objects - Dust Tight**

After testing, the EUT was cleaned externally before being opened for internal inspection. No dust ingress was found.

The central void of the EUT, defined in Figure 4, was not subjected to vacuum pressure during the test, and as such this void is excluded from the IP rating stated in this document.

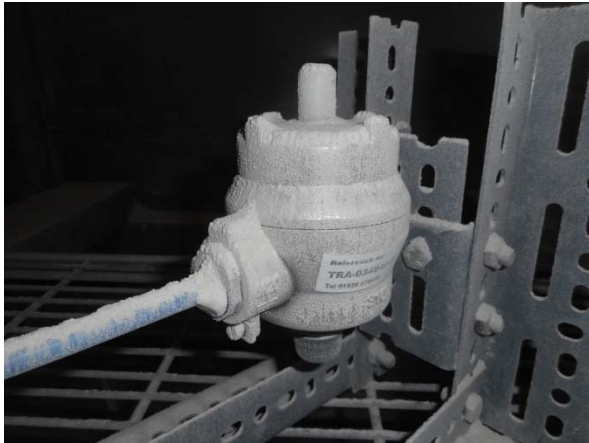
**IPX6 - Protected Against Powerful Water Jets**

After testing, the EUT was dried externally before being opened for internal inspection. No water ingress was found.

**IPX7 – Temporary Immersion in Water**

After testing, the EUT was dried externally before being opened for internal inspection. No water ingress was found.

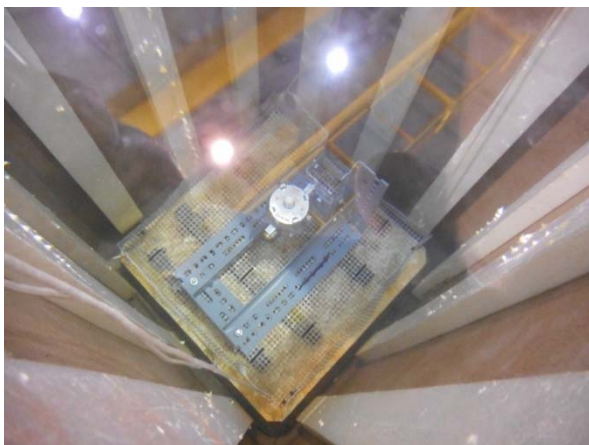
The EUT TRA-034946-S1 (excluding the void defined in Figure 4) therefore satisfies the requirements of BS EN 60529:1992+A2:2013, IP66 and IP67.



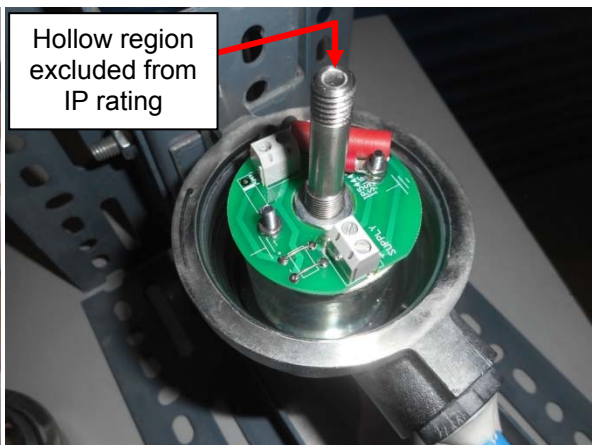
**EUT Upon Completion of IP6X Test  
Figure 1**



**EUT Undergoing IPX6 Test  
Figure 2**



**EUT Undergoing IPX7 Test  
Figure 3**



**EUT Central Void Definition  
Figure 4**