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KARANDIKAR LABORATORIES PVT. LTD. BOISAR

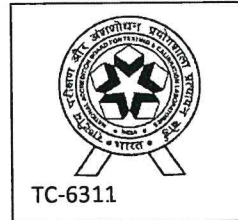
Format: F#07 b.1 Rev 10

TYPE TEST REPORT

IEC 60529:2013

Degrees of Protection Provided by Enclosures (IP Code)

Report No. : KLPL/BTG/19/09-40
 ULR No. : TC631119000000518F
 Discipline : Electrical Discipline
 Group/Category : Environmental Test Facility
 Sub-category : Ingress protection test



Date of issue..... : **12.10.2020**
 No. of pages : 09 PAGES + Annexure
 Compiled by (+ signature)..... : Rohit Patil *Patil*
 Designation: Testing Engineer
 Approved by (+ signature)..... : Javed Shaikh *Shaikh*
 Designation: Dy. Laboratory Manager

Item Received On : 12.09.2019 in Good Condition

Test Completion Date : 08.12.2019

Client

Name : **M/s. Rotork Controls (India) Limited**
 : 28 B, Ambattur Industrial estate (North),
 Ambattur, Chennai-600098.

Test Specification

Standard : **IEC 60529:2013**
 Specified IP-Code : **IP68**

Equipment Under Test

Type of Test Object : **Q450/F10 Type Actuator**
 Model No. : Q-300/Q-450
 Sr. No..... : 1C63490601
 Manufacturer : **M/s. Rotork Controls (India) Limited**

Annexure :

Drawing No..... : BR/MISC-10646/01, Rev.No.00, Dated:21.11.2017, (01 Page)

- NOTE : 1) This refers only to the particular item(s) submitted for testing.**
2) If necessary, this report shall be reproduced ONLY in full.



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 Laboratory: Gat#142, Betegaon, Boisar Chilhar Road, Opp. Union Park, Boisar (E) Tal-Palghar, Dist-Palghar-401501, INDIA
 Phone (02525) 284881/931

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Possible test case verdicts:

Test case does not apply to the test object : N (Not Applicable)

Test object does meet the requirement..... : P (Pass)

Test item does not meet the requirement : F (Fail)

Test case has not been checked : _____

General remarks:

"(See remark #)" refers to a remark appended to the report.

"(See appended table)" refers to a table appended to the report.

Throughout this report a point is used as the decimal separator.

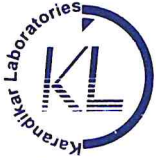
The test results presented in this report relate only to the object tested.

This test report shall not be reproduced except in full without the written approval of the testing Laboratory.

Note: - MAJOR EQUIPMENTS USED

Tests	Required Instruments	Id. No.	Cal Due Date	Used Y/N
1X	Accessibility probe 50 mm Dia.	K&A 405/1A	18.03.2020	N
2X	Accessibility Probe 12.5 mm Dia.	K&A 405 / 3B	18.03.2020	N
3X	Accessibility Probe 2.5mm Dia.	K&A 405 / 5A	18.03.2020	N
4X	Accessibility Probe 1mm Dia.	K&A 405 / 6B	18.03.2020	Y
5X / 6X	Manometer	K&A 071-04	27.04.2020	Y
	Rotameter 1.2 LPM	K&A 425	04.01.2020	Y
	DTC with sensor	K&A 581/2-12	01.04.2020	Y
	Timer	K&A 581/1-12	06.04.2020	Y
X3	Stop Watch	K&A 1171-18	11.09.2020	N
	Pressure Gauge	K&A 383/1	07.02.2020	N
X4	Stop Watch	K&A 1171-18	11.09.2020	N
	Pressure Gauge	K&A 384/1	07.02.2020	N
X5	Nozzle 6.3 mm dia.	K&A 381-16	14.04.2020	N
	Rotameter	K&A 419/2	04.01.2020	N
	Stop Watch	K&A 1171-18	11.09.2020	N
X6	Nozzle 12.5 mm dia.	K&A 382	14.04.2020	N
	Rotameter	K&A 1102-17	08.05.2020	N
	Stop Watch	K&A 1171-18	11.09.2020	N
X7 /X8	Scale	K&A 107	One time calibration	Y
	Stop watch	K&A 1171-18	11.09.2020	Y





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IEC 60529:2013			
Clause	Requirement - Test	Result- Remark	Verdict
10	Marking.		N
11	General requirement for tests.		
11.1	Tests should be carried out under the standard atmospheric conditions described in IEC 60068-1		P
11.2	Test samples shall be in a clean and new condition.		P
	The relevant product standard shall specify details such as: The number of samples to be tested;		N
	-conditions for mounting, assembling and positioning of the samples;		P
	-the pre-conditioning, if any, which is to be used;		N
	-whether to be tested energized or not;		N
11.5	Empty enclosures		
	If the enclosure is tested without equipment inside, the manufacturer shall ensure that after the electrical equipment is enclosed the enclosure meets the declared degree of Protection of the final product.		N

12	Tests for protection against access to hazardous parts indicated by the first characteristic numeral.			
First, characteristic Numeral.	Test means (Access probes)	Test force	Test Conditions Refer IEC 60529:2013	
0	No test required	-	-	N
1	The access probe, sphere of 50 mm \emptyset shall not fully penetrate and adequate clearance shall be kept.	50N \pm 10%	Cls.12.2	N
2	The jointed test finger may penetrate up to 80 mm length but adequate clearance shall be kept.	30N \pm 10%	Cls.12.2	N
3	The access probe, sphere of 2.5 mm \emptyset shall not penetrate and adequate clearance shall be kept.	3N \pm 10%	Cls.12.2	N
4	The access probe of 1,0 mm \emptyset shall not penetrate and adequate clearance shall be kept.	1N \pm 10%	Cls.12.2	N
5	Test conditions for IP 5X: Same As Above	1N \pm 10%	Cls.12.2	N
6	Test conditions for IP 6X: Same As Above	1N \pm 10%	Cls.12.2	P Test wire does not penetrate inside the UUT.



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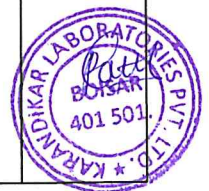
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IEC 60529:2013					
Clause	Requirement – Test			Result-Remark	Verdict
13	Tests for protection against solid foreign objects indicated by the First characteristic numeral.				
First, characteristic Numeral.	Test means (object probes and dust chamber)	Test force	Test Conditions Refer IEC 60529:2013		N
0	No test required	-	-		N
1	Rigid sphere without handle or guard 50 mm diameter.	50N ±10%	Cls.13.2		N
2	Rigid sphere without or guard 12, 5 mm diameter.	30N ±10%	Cls.13.2		N
3	Rigid steel rod 2,5mm diameter with edges free from burrs	3N± 10%	Cls.13.2		N
4	Rigid steel wire 1, mm diameter with edges free from burrs.	1N± 10%	Cls.13.2		N
5	Dust chamber, with under pressure	NA	Cls.13.4+13.5		N
6	Dust chamber, The enclosure is maintained below the Surrounding atmospheric pressure by a vacuum pump.	NA	Cls.13.4+13.6	For 8 Hrs, As extraction rate is less than 40 volumes per hour and max depression of 20 mbar.	P
13.6.2	Acceptance conditions for the first characteristic numeral 6X. The protection is satisfactory if no hazardous deposit of dust is observable inside the UUT at the end of test.			Before dust test. (i) IR test was conducted between all terminals are shorted together and the body of UUT, applied voltage 500 V.d.c for 1 minute. Observation: IR observed >10GΩ. Before dust test. (ii) HV test was conducted between all terminals are shorted together and the body of	P



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		<p>UUT, applied voltage 2KV a.c for 1 minute. Observation: No flash occurred. After dust test, (i) No ingress of powder found inside the UUT. (ii) IR test was conducted between all terminals are shorted together and the body of UUT, applied voltage 500 V.d.c for 1 minute. Observation: IR observed $>10G\Omega$. (iii) HV test was conducted between all terminals are shorted together and the body of UUT, applied voltage 2KV a.c for 1 minute. Observation: No flash occurred.</p>	
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Date: 12.10.2020

IEC 60529:2013				
Clause	Requirement – Test		Result-Remark	Verdict
14	Tests for protection against water indicated by the second characteristic numeral.			
Second, characteristic Numeral.	Test means	Test Conditions Refer IEC 60529:2013		N
0	No test required	Cls.14.2.0		N
1	Drip box, Enclosure on turntable	Cls.14.2.1		N
2	Drip box, Enclosure in 4 fixed positions of 15 ° tilt	Cls.14.2.2		N
3	oscillating tube or spray nozzle, 60° from vertical	Cls.14.2.3		N
4	oscillating tube or spray nozzle, 180° from vertical	Cls.14.2.4		N
5	6.3-mm nozzle, tested with a spraying nozzle, distance 2.5 m to 3 m, water flow rate 12.5 l/min	Cls.14.2.5		N
6	12.5-mm nozzle, tested with a spraying nozzle, distance 2.5 m to 3 m, water flow rate 100 l/min	Cls.14.2.6		N
7	Immersion tank, Temporary immersion in water in service position, Water temperature does not differ from that of equipment by more than 5K.	Cls.14.2.7		N
8	Immersion tank, Continuous immersion subject to agreement. Water temperature does not differ from that of equipment by more than 5K. Test Duration: 48 Hour.	Cls.14.2.8	Immersion depth: The UUT is located 3 meter below the surface of water.	P
-	Acceptance conditions for IPX8: The protection is satisfactory if no water has accumulated near the insulation, cable end or entered cables or interferes with the correct operation of the equipment.	Cls.14.3	Before water test. (i) IR test was conducted between all terminals are shorted together and the body of UUT, applied voltage 500 V.d.c for 1 minute. Observation: IR observed >10GΩ. Before dust test. (ii) HV test was conducted	P



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			<p>between all terminals are shorted together and the body of UUT, applied voltage 2KV a.c for 1 minute. Observation: No flash occurred.</p> <p>After water test, (i) No ingress of water observed inside the UUT. (ii) IR test was conducted between all terminals are shorted together and the body of UUT, applied voltage 500 V.d.c for 1 minute. Observation: IR observed >10GΩ. (iii) HV test was conducted between all terminals are shorted together and the body of UUT, applied voltage 2KV a.c for 1 minute. Observation: No flash occurred.</p>	
-	Tests for protection against access to hazardous parts indicated by the additional letter.	Cls.15		N

SUMMARY OF INGRESS PROTECTION TESTS ACCORDING TO IEC 60529:2013

Conclusion of the IP68 test: PASS.

The results of the tests were in compliance with the requirements in the standard IEC 60529:2013

UUT=Unit Under Test



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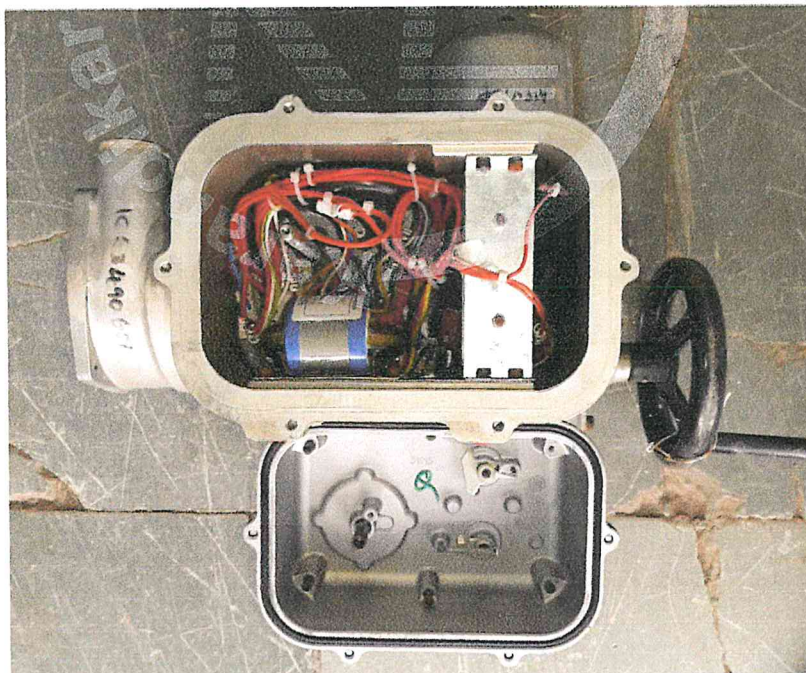
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Picture1: Q450/F10 Type Actuator



Pictute2: No ingress of powder & water observed



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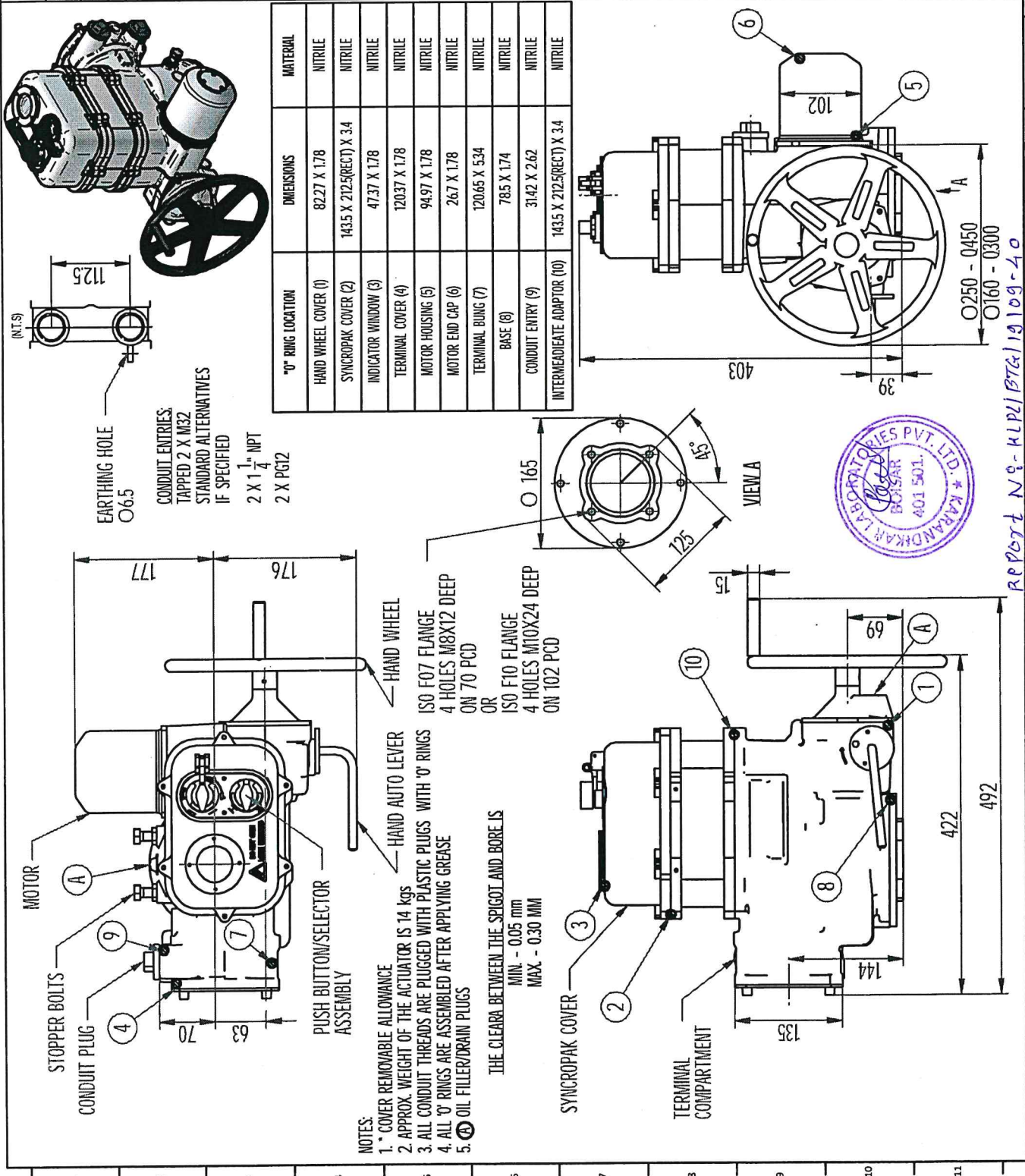


Pictute3: No ingress of powder & water observed

END OF REPORT



Drawing Number BR/MISC - 10646 / 01	Manufacturing dimensions specified in millimeters. Precise inch conversions for reference	Third angle projection	Sheet A4	Scale 1:0.25
Issue 01	Modifications			
FIRST ISSUE				
Title Q300 / 450 3 PHASE F07 / F10 IP68 APPROVAL DRAWING				
Drawn DAB	21.11.2017			
Checked DAB	21.11.2017			
Used on		No. off 1		
sheet no. 1 OF 1				
Drawing Number BR/MISC - 10646 / 01				
Rotork Rotork Controls (India) Pvt. Ltd. 288 Ambassador Industrial Estate (North Phase) Chennai 600 098.				



REPORT No- KLP/ BTG/ 19109-40