

Testing laboratory for climatic, mechanical  
and corrosive environmental stress




## QUALITY TEST CERTIFICATE

Test report No. 10995.03 / 14


Client	<b>Baumer Hübner GmbH</b> Max-Dohrn-Str. 2+4 10589 Berlin		
Equipment under test	<b>Incremental Encoder</b> SN Quantity	<b>HOGS151 DN 5000</b> 700001050791 1 unit	
Purpose	<b>Tests for the certification of the degrees of protection IP54</b>		
Test program	<b>Dust test</b> <b>Protection against splash water IPX4</b>	<b>IP5X</b>	<i>based on IEC 60529</i> <i>based on IEC 60529</i>
Test period	14 January to 12 February 2015		
Execution / results	see pages 2 to 4		
Total number of pages	6 (including 1 appendix)		

### Test results

The tests were performed according to the specifications of the standards and to the demands of the client.  
**No traces of dust were detected inside the incremental encoder HOGS151 DN 5000.**  
**Traces of water were detected inside the housing of the specimen.**  
**In agreement with the client the degrees of protection IP54 was proven for the incremental encoder HOGS151 DN 5000.**  
**Further evaluation will be done by the client.**

  
 Dipl.-Ing. R. Lein  
 Head of the testing laboratory  
 Berlin, 10 March 2015



  
 M.Eng. M. Sommerfeld  
 Test engineer

## 1 Purpose

Certification of the degrees of protection IP54 with overpressure for the **incremental encoder HOGS151 DN 5000** under defined environmental conditions, according to the specifications of the standards and to the demands of the client.

## 2 Equipment under test

Incremental Encoder	<b>HOGS151 DN 5000</b>
SN	700001050791
Quantity	1 unit
Arrival date of the samples	03 December 2014

## 3 Basics

### 3.1 Demands of the client

### 3.2 Used standards

**IEC 60068-1:1988 + Corr. 1988 + A1:1992**      **DIN EN 60068-1:1995-03**  
 „Environmental testing - Part 1: General and guidance”

**IEC 60529:1989 + A1:1999 + A2:2013**      **DIN EN 60529; VDE 0470-1:2014-09**  
 „Degrees of protection provided by enclosures (IP Code)“

## 4 Test program

### 4.1 Protection against solid foreign objects – Dust test IP5X based on the IEC 60529 § 13.4

EUT	not in operation
EUT position	axle vertical upright

The dust test includes the protection against access to hazardous parts test (protection against access with a wire). This is to be verified using a standardized test wire (Ø 1 mm, force 1 N). This test is to be performed before the dust test.

The EUT shall be exposed to a whirling air flow with finely distributed powder dust in the dust chamber. The test of the **degree of protection IP5X** shall be realized according to the standards:

test dust	talcum powder (composition and particle size according to standard)
test duration	2 - 8 h
enclosure category	deviating from the norm, the housing is pressurized with 0.1 bar overpressure according to the demands of the client

#### **Visual inspection**

After the dust test IP5X the specimen will be visually examined for eventual mechanical damage or any other alterations. The opening of the specimen and the examination for penetrated dust will be carried out after the test IPX4.

#### 4.2 Protection against splash water IPX4

based on the IEC 60529 § 14.2.4

For the certification of the **degree of protection IPX4** the following specifications of the standard apply:

EUT	not in operation
EUT position	axle vertical upright
test set-up	standardized spray nozzle
water flow-rate	10.0 l/min ± 5 %
water pressure	according to the specified flow-rate
clearance	approx. 300 mm - 500 mm (spray nozzle to housing)
test duration	5 min
enclosure category	deviating from the norm, the housing is pressurized with 0.1 bar overpressure according to the demands of the client

##### **Visual inspection**

After the splash water test IPX4 the specimen will be examined for external damage and for any other alterations. Subsequently, the specimen will be opened and examined for penetrated dust or water.

## 5 Execution

The degrees of protection test IP54 for the **incremental encoder HOGS151 DN 5000** was performed according to the test program (sections 4.1 to 4.2), in compliance with the specifications of the current standards and with the demands of the client.

##### **Visual inspection**

After the respective individual tests (IP5X and IPX4) the specimen were examined for external damage and any other alterations.

After the test for the degrees of protection IPX4 the specimen were opened and examined for the presence of penetrated dust or water.

##### **Acceptance criteria**

In the **protection against access to hazardous parts IP5X** the test wire (Ø1 mm, 1N) must not penetrate the housing.

The **dust test IP5X** is satisfactory, if an inspection reveals that the talcum powder has not collected in a quantity or location such, that if it had been any other type of dust, it could have led to impairment in the proper functioning or safety of the equipment.

The **protection against splashing water IPX4** is proven, if at the end of the test no water has penetrated into the sample, or if it has it is in a quantity such that it does not impair the proper functioning or safety of the equipment.

##### **Measurement and test devices**

Name	Type	Serial No.	Maker
Rigid IEC steel wire	P 10.27	50 11 594	PTL
Dust chamber	SK 160	-	AUCOTEAM
Talcum powder	-	210410	KSL
Standardized spray nozzle	P 05.24	50 60 183	PTL
Turn table	-	-	AUCOTEAM
IR thermometer	Fluke 561	14950036	Fluke
DC-controller	3222	1149	Statron
Steel pump	EVMG 5 16N5	BHX230217	EBARA
Vacuum pump	N035.3AN.18	1255143	Neuberger
Vacuum regulator	VAR	-	Roth
Air pressure sensor	FDA612MA	01050112	Ahlborn
Data logger	MA 2290-8	H04030040G	Ahlborn

## 6 Results

The degrees of protection test IP54 for the *incremental encoder HOGS151 DN 5000* was performed according to the test program.

### 6.1 Protection against solid foreign objects – Dust test IP5X

*based on the IEC 60529 § 13.4*

After the degrees of protection test IP5X for the *incremental encoder HOGS151 DN 5000*

- **Dust test** **Test IP5X** *based on the IEC 60529*

the following was detected:

- The test wire could not penetrate the housing.
- No external damage or any other alterations
- No traces of dust was inside the specimen.

### 6.2 Protection against splash water IPX4

*based on the IEC 60529 § 14.2.4*

After the protection against water jets test IPX4 for the *incremental encoder HOGS151 DN 5000*

- **Protection against splash water** **Test IPX4** *based on the IEC 60529*

the following was detected:

- Without external damage or any other alterations.
- Traces of water were detected inside the housing of the specimen.
- Circuit board without traces of water.
- The client estimates the determined water inside the housing as non-critical.  
The degrees of protection IP54 was proven.

Further evaluation will be done by the client.

**The tests were performed according to the specifications of the standards and to the demands of the client.**

**No traces of dust were detected inside the incremental encoder HOGS151 DN 5000.**

**Traces of water were detected inside the housing of the specimen.**

**In agreement with the client the degrees of protection IP54 was proven for the incremental encoder HOGS151 DN 5000.**

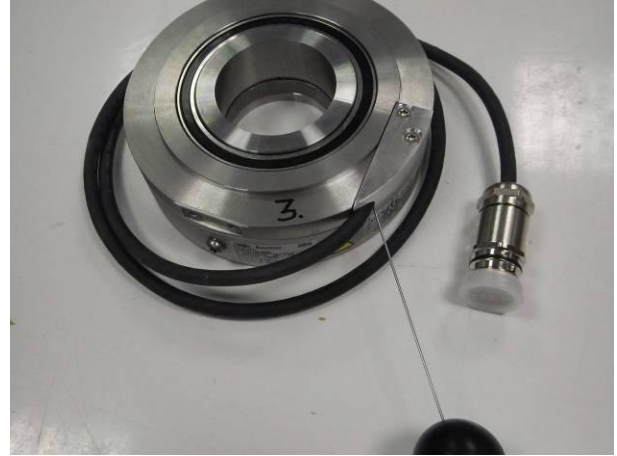
**Further evaluation will be done by the client.**

The results of the tests refer only to the above mentioned equipment under test. This report, or individual pages of this test report, may only be copied following the written consent of the testing laboratory. This test report No. 10995.03 / 14 includes 4 pages and 1 appendix – pictures

## Pictures



**Picture 1**  
Incremental encoder HOGS151 DN 5000  
with standardized test wire (Ø 1 mm, 1 N)  
before the access to hazardous parts test IP6X



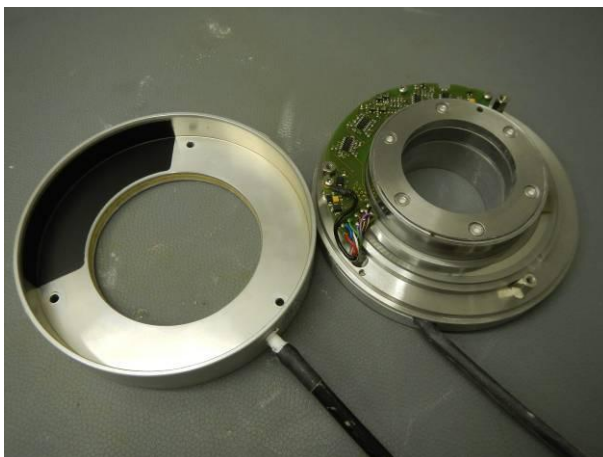
**Picture 2**  
Incremental encoder HOGS151 DN 5000  
with standardized test wire (Ø 1 mm, 1 N)  
during the access to hazardous parts test IP6X



**Picture 3**  
Incremental encoder HOGS151 DN 5000 in the  
dust chamber SK 160 with overpressure hose  
before the dust test IP6X



**Picture 4**  
Incremental encoder HOGS151 DN 5000 in the  
in the dust chamber SK 160 with overpressure hose  
after the dust test IP6X



**Picture 5**  
Incremental encoder HOGS151 DN 5000  
without visible traces of dust inside  
after the dust test IP6X



**Picture 6**  
Incremental encoder HOGS151 DN 5000  
without visible traces of dust inside  
after the dust test IP6X





**Picture 7**  
Incremental encoder HOGS151 DN 5000  
mounted on the turn table  
*before the protection against splash water test IPX4*



**Picture 8**  
Incremental encoder HOGS151 DN 5000  
with equipment for overpressure regulation  
*before the protection against splash water test IPX4*



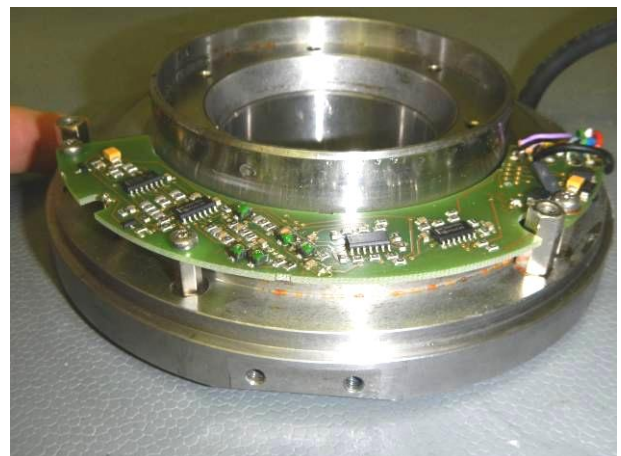
**Picture 9**  
Incremental encoder HOGS151 DN 5000  
with standardized splash water  
*during the protection against splash water test IPX4*



**Picture 10**  
Incremental encoder HOGS151 DN 5000  
with visible traces of water inside the housing  
*after the protection against splash water test IPX4*



**Picture 11**  
Incremental encoder HOGS151 DN 5000  
with visible traces of water inside the housing  
*after the protection against splash water test IPX4*



**Picture 12**  
Incremental encoder HOGS151 DN 5000  
without visible traces of water on the circuit board  
*after the protection against splash water test IPX4*