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DELTA Test Report



TEST Reg. no. 19

IP 69K enclosure tightness tests of Nawi indicator 190

Performed for Cardinal Scale Manufacturing co.

DANAK-1911367

Project no.: T200062

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12 April 2011

DELTA

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Title IP 69K enclosure tightness tests of Nawi indicator 190

Report no. DANAK-1911367

Project no. T200062

Test period 30 - 31 March 2011

Client Cardinal Scale Manufacturing co.
203 East Daugherty Street
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Webb City
Michigan 64870
USA

Contact person Mr Stephen Langford
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Test specimen One Cardinal Scale Manufacturing co. Nawi indicator 190 as received at DELTA on 17 March 2011 :

Designation: Cardinal
Type: MODEL 190
Serial no. : E01711-0209

-including relevant cables/connectors attached.

See also photos in the documentation on the following pages. For any further identification of the test specimen, please refer to Cardinal Scale Manufacturing co.

Specifications The classification **IP 69K** is based on the three enclosure protection standards DIN 40050 part 9, NT ELEC 023 and IEC 60529.

First numeral 6, IP 6x.

IEC60529: Degrees of protection provided by enclosures (IP Code).
First numeral 6 implies the following hazard protection as well as dust protection of the enclosure.

Hazard protection, IP 6x:

There must be sufficient clearance between the standard 1 mm Ø access probe rod and hazardous internal parts, when the probe is pushed against any openings of the enclosure with 1 N. Probe length 100 mm.

Dust protection, Category 1, IP 6x:

Dust: Talcum powder (75 µm)

Concentration: 2 kg/m³

Underpressure: 2 kPa (20 mbar), or less, below ambient.

Duration: As required to draw 80 enclosure volumes,
-max 8 hours (if < 10 vol./h at 20mbar)

-min 2 hours (if 40 - 60 vol./h at <20mbar)

No deposit of dust must be observable inside the enclosure at the end of exposure.

(Comment: Talcum powder is used: The DIN standard points to Portland cement and fly ash, but allows other dust to be agreed upon.)

Second numeral 9K, IP x9K

This is the IP code of DIN 90050 Part 9 for high pressure jets of 80 °C water impinging on an enclosure with an impact pressure of 100kPa. The guidelines of the NT ELEC 023 standard are followed.

High pressure water jets, IP x9K:

Impact pressure: 100 kPa

Test duration: 1 min per m², at least 3 min

Water temperature: 80 °C

Distance nozzle-specimen: 250 mm

The jets must not have any damaging effects and water must not accumulate to interfere with correct operation of the equipment or to impair safety.

(Comment: The DIN setup geometry is simplified by using impact pressure instead of the DIN specified nozzle pressure 10.000 kPa. DELTA calibrates impact versus nozzle pressure according to NT-ELEC 023.)

Results

In agreement with the standard, no verification was carried out for the “Hazard protection”, since the requirements are obviously met.

Visual inspections were carried out by DELTA immediately after each test, where the cabinet was opened. No ingress of dust or water was found.

The cabinet can thus be classified IP 69K.

Exposures and results are documented by photos on the following pages.

First water jet exposure was performed along all assembly areas, seals and cable glands, for a combined duration of 3 minutes.

Next, the dust test was performed with 8 hours of exposure, since the flow at 20 mbar underpressure was negligible.

DELTA test facilities used:

EVFGT-34: DELTA Wet room

EVFGT-49: Weiss IP dust chamber

The test results apply to the tested specimen only.

Test personnel Carsten Meldgaard
Tom Hjerting Nielsen

Date 12 April 2011

Project manager



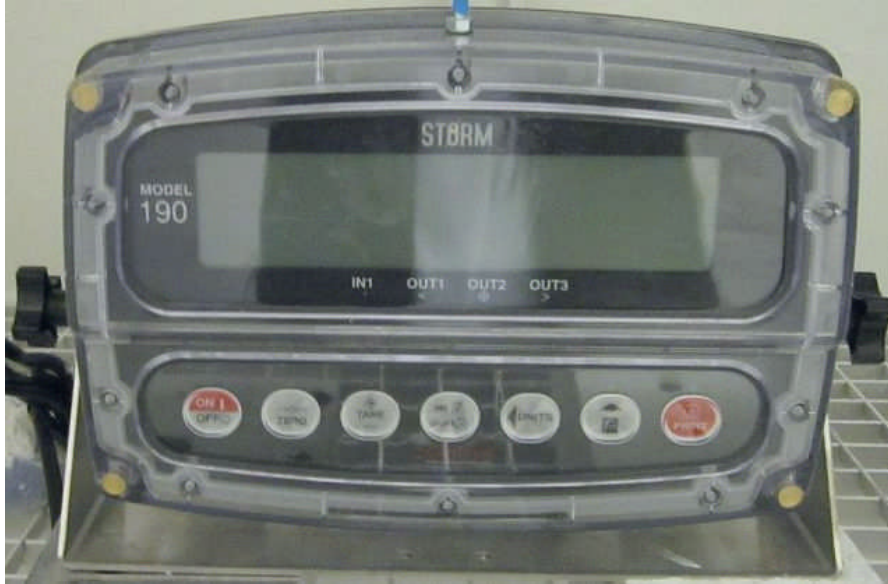
Carsten Meldgaard, Technician
DELTA

Responsible



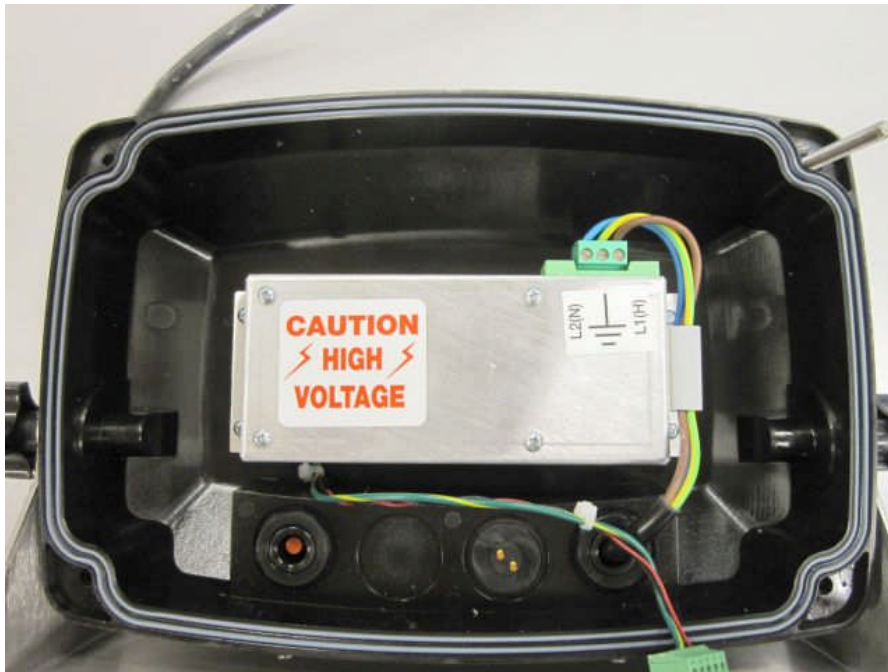
Kim A. Schmidt, B.Sc.M.E
DELTA

Documentation

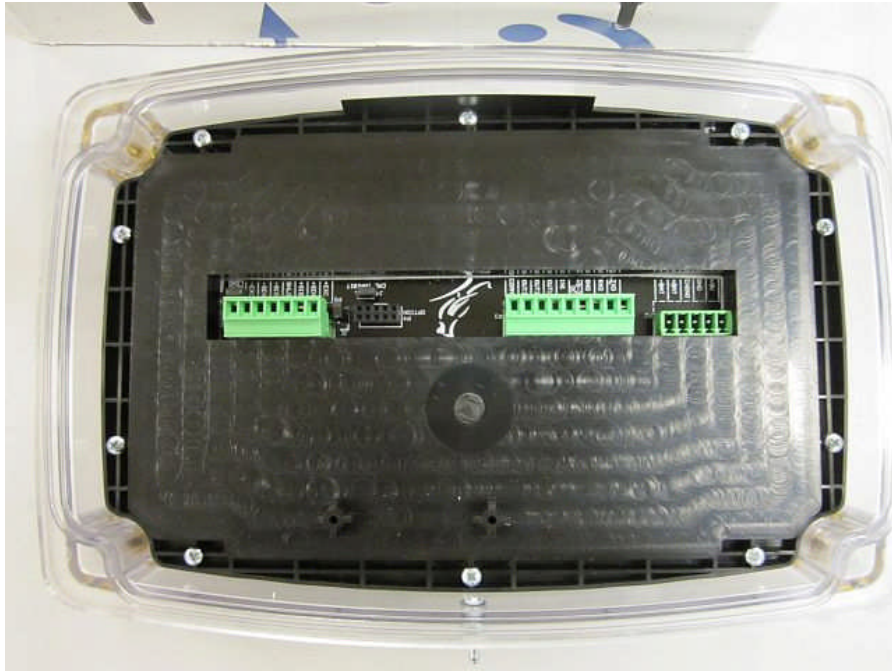


Test Specimen

Front view.



Disassembly showing seal and cable glands.

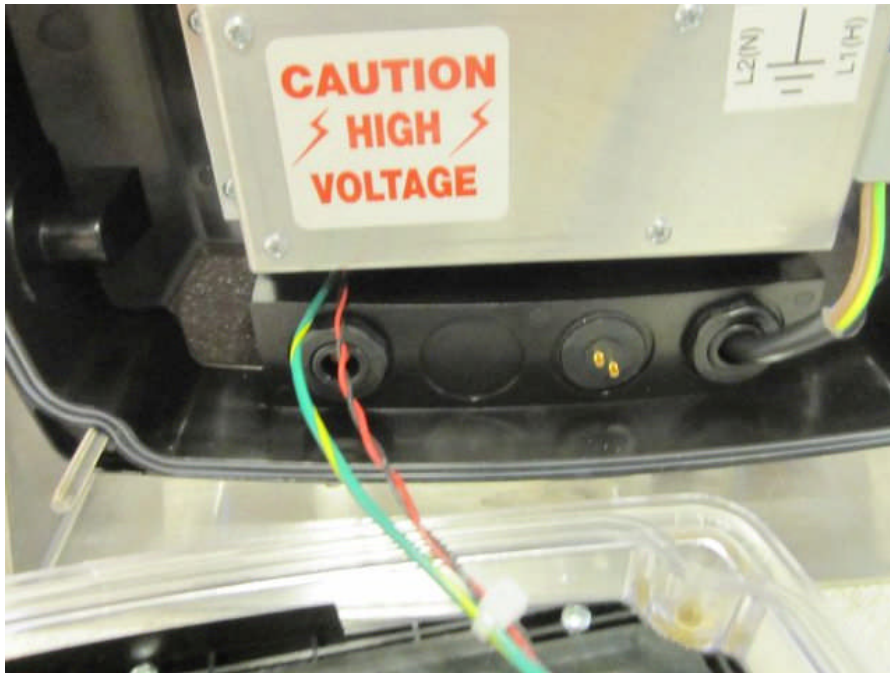


Rear part.



Water jet

Exposure.



Opening after exposure: No water.



Dust test

Unit in dust chamber at end of exposure.

(Subsequently wiped completely clean before opening.)



Unit opened after wiping completely clean:

No dust inside.