Sealing Touch Screen panels according to IP 65 Specifications

Document Revision History

<table>
<thead>
<tr>
<th>Release Date</th>
<th>A0</th>
<th>November 2011</th>
</tr>
</thead>
</table>
| Revision     | A1 | January 2013  | • Added OQC  
| History      |    |               | • Added Tools and Materials  
|              |    |               | • Added graphics to glue application |

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Warning

Use only Lumio approved parts / materials. Use of non-Lumio parts or non-approved materials may impair the IP 65 integration process. 

Read the entire manual and familiarize all instructions before sealing Touch Screens according to IP65 specifications.

Technical Assistance

For technical questions and troubleshooting assistance:

- Contact the Lumio office closest to you
- Visit us at our website: www.lumio.com
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1. Overview

This document describes how to seal Lumio Touch Screen panels according to IP65 standards. IP65 is defined as following:

Table 1: International Protection Number Table

<table>
<thead>
<tr>
<th>First Number (Protection against solid objects)</th>
<th>Definition</th>
<th>Second Number (Protection against liquids)</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Totally protected against dust</td>
<td>5</td>
<td>Protection against low pressure jets if water from all directions – limited ingress permitted</td>
</tr>
</tbody>
</table>

2. Limitations

The following limitations apply when sealing Lumio Touch Screen panels according to IP65 specifications.

- IP65 can only be implemented on dual sensor systems
- Only Jenoptic sensors can be used
- Place the two sensors on the top corners of the panel only
- Only position the mounted Touch Screen vertically
- Only attach the PCB Controller when the monitor is positioned vertically

3. Pre-Requirement: Panel Assembly

Before sealing, ensure that the Touch Screen panel components are assembled according to Lumio requirements (See the Assembly guides posted on the Lumio website: www.lumio.com), subject to the IP 65 requirements stated hereafter (See Requirements on page 5).
4. Tools and Materials

The following tools and materials are required to seal Touch Screens according to IP65.

Table 2: Tools and Materials

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number (P/N)</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>3M EPX Plus II Applicator</td>
<td>62-9170-9930-1</td>
<td></td>
</tr>
<tr>
<td>3M EPX Nozzle, Square Gold</td>
<td>62-9171-9153-8</td>
<td></td>
</tr>
<tr>
<td>3M EPX Nozzle, green</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dispense tip: TT 22 Gauge - Blue</td>
<td>OKI 922125-DHUV or: OEM TT22-DHUV</td>
<td></td>
</tr>
<tr>
<td>Dispense tip: TE 21 Gauge - Purple</td>
<td>OKI 921050-TE or: OEM TE71050</td>
<td></td>
</tr>
<tr>
<td>Dispense tip: 45° gauge – Purple</td>
<td>TE721050B45</td>
<td></td>
</tr>
<tr>
<td>Sealing glue: 3M Epoxy glue DP105</td>
<td>3M Id: 62-3287-3830-7-3</td>
<td></td>
</tr>
<tr>
<td>Tesa double sided tape</td>
<td>Tesa Id: 5696</td>
<td></td>
</tr>
</tbody>
</table>
5. Sealing Touch Screens according to IP65 Specifications

5.1 Requirements

The following requirements apply when sealing Touch Screen panels according to IP65 specifications.

1. Attach the Rod Holders and Decorative Rod to the glass panel with Tesa double sided tape.

   **Note:** Ensure that there is no gap between the Rod Holder edge and the tape edge (The Rod-Holder and the tape can be cut together during the production process).

   Figure 1 Attaching Double-sided Tape to Rod Holder

2. When attaching Sensors to the glass panel, ensure that:
   
   - There is **no** gap between the sensors and the Rod Holders
   - The sensors protrude 2mm into the Active Barrier

   Figure 2 Sensor Protrusion into Active Barrier
5.2 Panel Sealing Process

1. Prepare the tools and materials necessary to seal the panels: Assemble the epoxy applicator and components as displayed below.

<table>
<thead>
<tr>
<th>Table 3 Preparing the Epoxy Glue</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a.</strong> Clean all accumulated lumps of glue, ensure that the glue flows smoothly and evenly.</td>
</tr>
<tr>
<td><strong>b.</strong> Attach nozzle to mixing nozzle.</td>
</tr>
<tr>
<td><em>Figure 3 Removing lumps of glue</em></td>
</tr>
<tr>
<td><em>Figure 4 Attach nozzle</em></td>
</tr>
<tr>
<td><strong>c.</strong> Squeeze the applicator – ensure that the glue flows smoothly and evenly through the nozzle and that it comes out the nozzle uniformly.</td>
</tr>
<tr>
<td><strong>d.</strong> Attach the needle and repeat step c.</td>
</tr>
<tr>
<td><em>Figure 5 Attach nozzle</em></td>
</tr>
<tr>
<td><em>Figure 6 Attach needle</em></td>
</tr>
</tbody>
</table>
2. Seal the panel with the epoxy glue.

Reference: The following reference diagram displays where to apply the epoxy, that is, between the sensor and the Rod Holder.

Figure 7 Sealing Panels

To seal the panel with epoxy glue:

Table 4 Sealing the Panel

| a. Apply the epoxy in the gaps between the sensor and the Rod Holder – starting from the gap between them on the glass panel and proceeding to the gap between the sides and tops of the components. |
| Warning: Ensure that no epoxy glue is applied to, touches or blocks the camera lens on the sensor. |

Figure 8 Applying epoxy

Figure 9 Epoxy applied between Sensor and Rod Holder

![Image of sealing panels with epoxy glue applied](image-url)
3. Review the results of the glue process through the glass. Ensure that the sealing glue touches the Rod Holders and sensors.

4. Wait 5 minutes for the glue to cure.
6. Integrating a Touch Screen into a Monitor

The following components and materials are required to mount a Touch Screen sealed according to IP65 requirements, onto a monitor.

Table 5: Integration Components and Materials

<table>
<thead>
<tr>
<th>Item ID</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LCD panel</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Double sided tape 3M VHB tape 0.64mm / thin foam</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Crystal Touch panel (glass with optical elements)</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Elastic Gasket, foam 4mm</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Front bezel</td>
<td>1</td>
</tr>
</tbody>
</table>

To integrate the touch screen on the monitor:

1. Attach the double sided tape / foam to the monitor (see steps 1 – 2 below).
2. Attach the Touch Screen panel to the monitor (see steps 1 – 3 below).
3. Attach the gasket to the bezel (see steps 4 – 5 below).
4. Attach the front bezel to the monitor.

**Note:**
- Ensure that the gasket touches the optical elements but does not apply pressure to them
- Ensure that the gasket touches the entire touch screen perimeter

Figure 12: Integrating the Touch Screen on the Monitor
Note: In the following diagram, the gasket touches the optical parts and prevents water penetrating the system.

Figure 13: Side view of assembled touch screen into the monitor.
7. OQC: Testing Panels

Test the sealed system in order to ensure compliance with IP65 specifications.

7.1 Requirement:

Before performing the OQC, ensure that the Touch Screen is integrated into the monitor as described in chapter 6 above.

This section includes:
- Testing the panel for solid particle protection
- Testing the panel for protection against water

7.2 Testing the panel for solid particle protection

For IP65, the level of solid particle protection is 6, that is, the touch screen is Totally protected against dust.

7.2.1 Test Process

To test the panel for solid particle protection according to IP65 standards:

Place the panel in a dust chamber and run the test or:
In the absence of a dust chamber, spray the panel with talcum powder.

Note: Protect the camera lens when conducting the test.

7.2.2 Expected test results

The penetration of dust is entirely prevented.

7.3 Testing the panel for protection against water

For IP65, the level of liquid protection is 5, that is, the Touch Screen is protected against low pressure jets if water from all directions – limited ingress permitted.

This section includes:
- Water Spray Test
- Immersion Test

7.3.1 Water Spray Test

7.3.1.1 Test Process

To test the panel for protection by spraying water on the panel:
1. Prepare a nozzle with an internal diameter of 6.3 mm (Approximately 13 liters/min)
2. Spray water on the system for 4 minutes as follows:
   - 1 minute on bottom bar
   - 1 minute on top bar
   - 1 minute on left bar
• 1 minute on right bar

The following picture displays water sprayed on a screen.

Figure 14: Spraying water

7.3.1.2 Expected Test Results

The water jet test is successful if the following tests results are received:

• The DUT was not functional during the test. After the test, the DUT regains functionality
• No DUT functional abnormality occurred after the test
• Water penetration did not impair the normal operation of the DUT after the test
• Water did not come into contact with any conductors not insulated against humidity
• Water did not penetrate the cables
• Water did not settle in the cable terminals

7.3.2 Immersion Test

The Immersion test is designed to test water penetration between the Touch Panel glass and the monitor during a prolonged period.

7.3.2.1 Test Process

To perform the water immersion test:

1. Place a glass touch panel on a monitor.
2. Immerse the glass touch panel in water.

Figure 15: Immersion Test
7.3.2.2 Expected Test Results:

The water jet test is successful if the following tests results are received:
No water penetration occurs.