

MOVIA – IP65 Conversion Application Note

1 Introduction

By design Cambridge Technology’s MOVIA scan head is rated for IP50 but consideration has gone into what it would take to achieve IP65. Using the methods and parts outlined in this application note, the MOVIA scan head has passed third-party testing for IP65.

2 IP Rated Enclosures Explained

2.1 What is a IP Rating?

IP (or “Ingress Protection”) ratings are defined in international standard EN 60529 (British BS EN 60529:1992, European IEC 60509:1989). They are used to define levels of sealing effectiveness of electrical enclosures against intrusion from foreign bodies (tools, dirt, etc) and moisture.

2.2 What do the Numbers in IP Rating Mean?

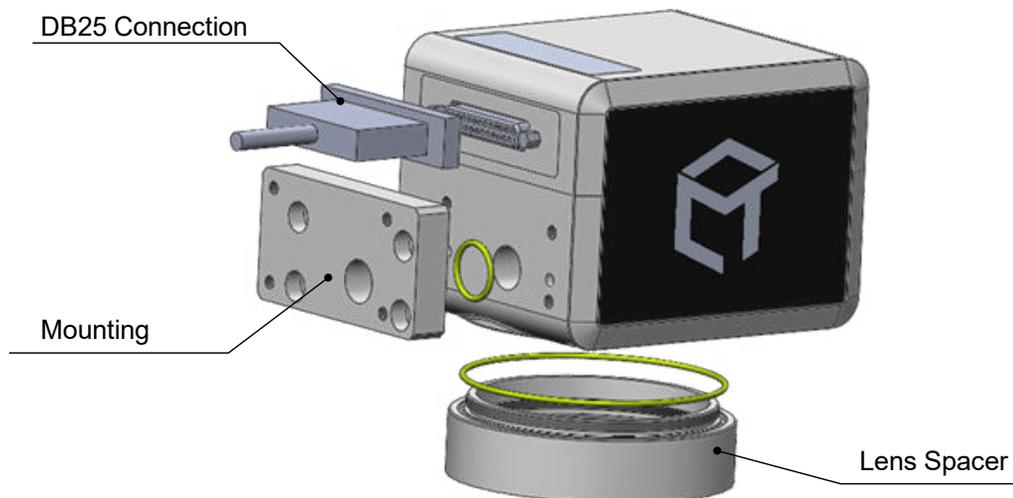
The numbers that represent the IP rating each have a specific meaning. The first indicates the degree of protection (of people) from moving parts, as well as the protection of enclosed equipment from foreign bodies. The second defines the protection level that the enclosure enjoys from various forms of moisture (drips, sprays, submersion, etc). The tables below should help make sense of it:

Level	Object Size Protected Against	Effective Against
0	Not Protected	No Protection
1	>50mm	Any large surface of the body, such as the back of the hand, but no protection against deliberate contact with a body part
2	>12.5mm	Fingers or similar objects
3	>2.5mm	Tools, thick wires, etc
4	>1mm	Most wires, screws, etc
5	Dust Protected	Ingress of dust is not entirely prevented, but it must not enter in sufficient quantity to interfere with the satisfactory operation of the equipment; complete protection against contact
6	Dust Tight	No ingress of dust; complete protection against contact

Level	Protected From
0	Not Protected
1	Dripping water (vertically falling drops) shall have no harmful effect
2	Vertically dripping water shall have no harmful effect when the enclosure is tilted at an angle up to 15° from its normal position
3	Water falling as a spray at any angle up to 60° from the vertical shall have no harmful effect
4	Water splashing against the enclosure from any direction shall have no harmful effect
5	Water projected by a nozzle (6.3mm) against enclosure from any direction shall have no harmful effects
6	Water projected in powerful jets (12.5mm nozzle) against the enclosure from any direction shall have no harmful effects
7	Ingress of water in harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time (up to 1 m of submersion)
8	The equipment is suitable for continuous immersion in water under conditions which shall be specified by the manufacturer. Normally, this will mean that the equipment is hermetically sealed. However, with certain types of equipment, it can mean that water can enter but only in such a manner that it produces no harmful effects

3 Converting MOVIA from IP50 to IP65

Protective measures must be taken at the three interfaces to bring the scan head from IP50 to IP65. Those interfaces are the DB25 connector, the mounting plate, and the lens spacer. These interfaces are labeled in the diagram below.



3.1 DB25 Connection

To achieve an IP65 rating, the cable that plugs into the MOVIA scan head must be greater than or equal to the IP65 rating. These cables typically have a flexible shroud around the connection point to prevent ingress, as shown in the figure below.



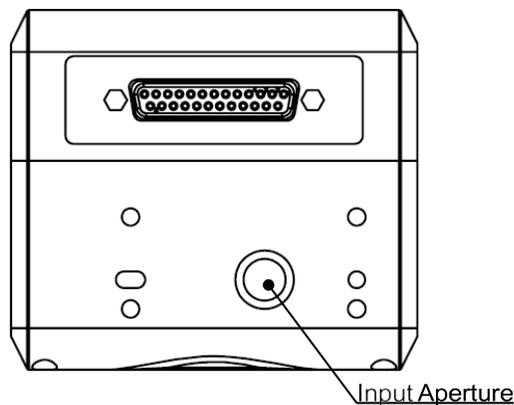
We offer the following recommendations:

Mfg: Assmann WSW Components Mfg Part #: A-DS25-HOOD-WP

Digikey Part #: AE10146-ND

3.2 Mounting Plate/Input Aperture

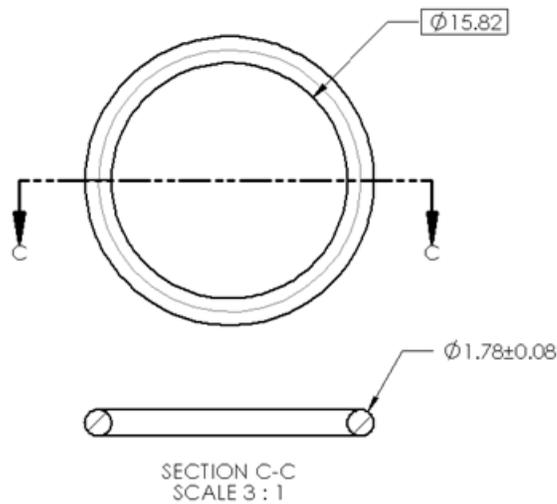
The next area where care must be taken is the mounting area around the input aperture. The customer supplied mounting bracket will need to accommodate an o-ring to seal the input aperture of the scan head against ingress.



Based upon our testing, Cambridge Technology offers the following suggestion for an o-ring, along with design considerations for its use.

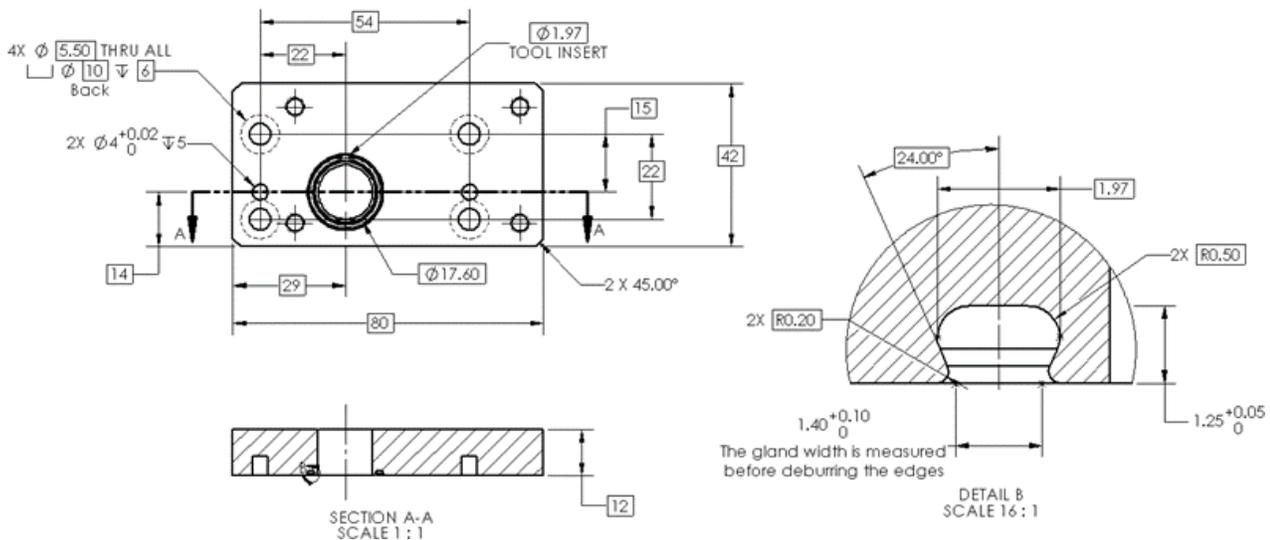
NOTES:

1. MATERIAL: NBR
2. This drawing is to show the size of the o-ring and **Parker No.2-016** is recommended.



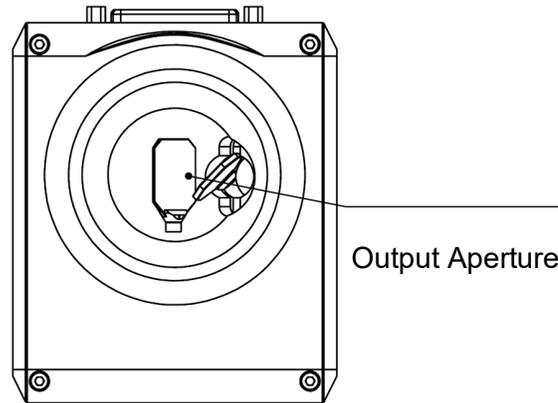
NOTES:

1. MATERIAL: AL 6061-T6
2. FINISH: BLACK ANODIZE
3. This drawing is only to show the size and location of the sealing dovetail groove.



3.3 Lens Spacer/Output Aperture

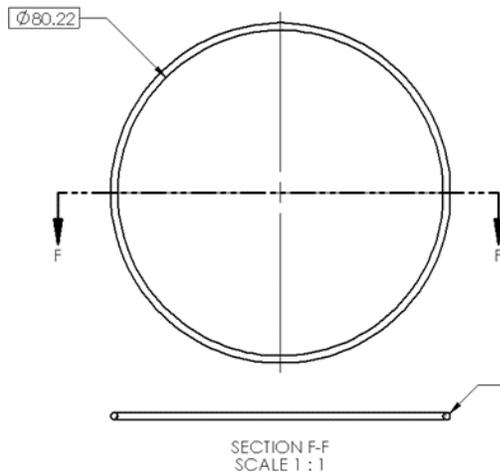
The last item to consider when converting a MOVIA scan head to IP65 in the F-Theta lens spacer. Like the input, the output aperture does not accommodate an o-ring by default. Therefore, the lens spacer for the F-Theta lens will need to.



Again, based upon our testing, Cambridge Technology offers the following suggestion for an o-ring, alongwith design considerations for its use.

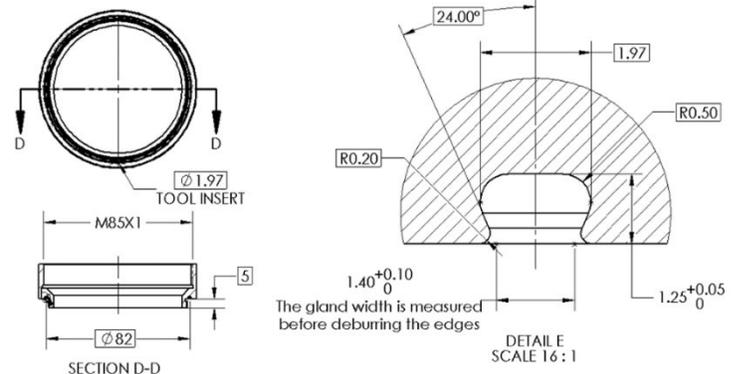
NOTES:

1. MATERIAL: NBR
2. This drawing is to show the size of the o-ring and **Parker no.2-042** is recommended.



NOTES:

1. MATERIAL: AL 6061-T6
2. FINISH: BLACK ANODIZE
3. This drawing is only to show the size and location of the sealing dovetail groove.



Please keep in mind that the F-Theta lens will also need to support an IP65 rating. Please consult with your lens manufacturer or supplier on the suitability of your lens for this rating.

3.4 Rev Control

Date	ECO	Revision	Notes
1/20/20 21	EC1136	A	Release